

DEPARTMENT OF ENERGY RESEARCH INITIATIVES AND
TECHNOLOGY COMPETITIVENESS ACT OF 1988

SEPTEMBER 26, 1988.—Ordered to be printed

Mr. JOHNSTON, from the Committee on Energy and Natural Resources, submitted the following

REPORT

[To accompany H.R. 4505]

The Committee on Energy and Natural Resources, to which was referred the bill (H.R. 4505) to authorize appropriations to the Department of Energy for civilian research and development programs for fiscal year 1989, having considered the same, reports favorably thereon with an amendment to the bill and an amendment to the title and recommends that the bill, as amended, do pass.

The amendments are as follows:

1. Strike out all after the enacting clause and insert in lieu thereof the following:

That this Act may be cited as the "Department of Energy Research Initiatives and Technology Competitiveness Act of 1988".

TITLE I—NATIONAL LABORATORY COOPERATIVE RESEARCH INITIATIVES

SEC. 101. SHORT TITLE.

This title may be cited as the "Department of Energy National Laboratory Cooperative Research Initiatives Act".

SEC. 102. DEFINITIONS.

For purposes of this title, the term—

(a) "National Laboratory" means the following Department of Energy laboratories—

- (1) Lawrence-Livermore National Laboratory;
- (2) Lawrence-Berkeley National Laboratory;
- (3) Los Alamos National Laboratory;
- (4) Sandia National Laboratory;
- (5) Fermi National Accelerator;
- (6) Princeton Plasma Physics Laboratory;
- (7) Idaho National Engineering Laboratory;
- (8) Argonne National Laboratory;

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- (9) Brookhaven National Laboratory;
- (10) Oak Ridge National Laboratory;
- (11) Pacific Northwest Laboratory;
- (12) Ames Laboratory;
- (13) Stanford Linear Accelerator Center;
- (14) Bates Linear Accelerator Facility;
- (15) Center for Energy and Environment Research;
- (16) Coal Fired Flow Facility;
- (17) Energy Technology Engineering Center;
- (18) Hanford Engineering Development Laboratory;
- (19) Inhalation Toxicology Research Institute;
- (20) Laboratory for Energy-Related Health Research;
- (21) Laboratory of Biomedical and Environmental Sciences;
- (22) Laboratory of Radiobiology and Environmental Health;
- (23) Michigan State University-DOE Plant Research Laboratory;
- (24) Notre Dame Radiation Laboratory;
- (25) Oak Ridge Associated Universities;
- (26) Radiobiology Laboratory;
- (27) Savannah River Ecology Laboratory;
- (28) Savannah River Laboratory;
- (29) Solar Energy Research Institute; and
- (30) Stanford Synchrotron Radiation Laboratory.

Such term also includes any future government-owned, contractor-operated laboratory facilities established as Department of Energy Multi-program Laboratories or Program-Dedicated Facilities. Such term does not include Naval Nuclear Propulsion Reactor Laboratories, or their contractors or subcontractors performing work covered under Executive Order 12344, as codified in section 7158 of title 4, United States Code.

(b) "Secretary" means the Secretary of Energy.

(c) "Federal Agency" means any executive agency as defined in section 105 of title 5, United States Code, and the military departments defined by section 102 of title 5, United States Code.

(d) "contract" means any contract, grant, or cooperative agreement as those terms are used in sections 6303, 6304, and 6305 of title 31, United States Code, entered into between any Federal agency and any contractor for the performance of experimental, developmental, or research work funded in whole or in part by the Federal Government. Such term includes any assignment, substitution of parties, or subcontract of any type entered into for the performance of experimental, developmental, or research work under a contract.

(e) "cooperative research and development agreement" means any agreement between one or more National Laboratories and one or more non-Federal parties under which the Government, through its National Laboratories, provides personnel, services, facilities, equipment, or other resources with or without reimbursement (but not funds to non-Federal parties) and the non-Federal parties provide funds, personnel, services, facilities, and equipment, or other resources toward the conduct of specified research and development efforts which are consistent with the missions of the National Laboratory; except that such term does not include a procurement contract or cooperative agreement as those terms are used in sections 6303, 6304, and 6305 of title 31, United States Code.

(f) "funding agreement" means any contract, grant, or cooperative agreement entered into between the Secretary of Energy and a contractor operating a National Laboratory of the Department of Energy that provides for such contractor to perform research and development at such National Laboratory.

SEC. 103. POLICY.

(a) It is a mission of the National Laboratories to foster, consistent with the national security and a fair return on the taxpayers' investment, the commercialization of technology developed in connection with activities of such Laboratories authorized under subtitle A and other law.

(b) The Secretary shall take such actions as he finds appropriate and consistent with law to further the mission set forth in subsection (a).

**SUBTITLE A—THE DEPARTMENT OF ENERGY NATIONAL LABORATORIES
CENTERS FOR RESEARCH ON ENABLING TECHNOLOGIES FOR HIGH TEM-
PERATURE SUPERCONDUCTING APPLICATIONS**

SEC. 110. FINDINGS.

For purposes of this subtitle, Congress finds that—

(1) the Department of Energy has conducted extensive research in superconducting materials to support its programmatic activities in High Energy Physics, Magnetic Fusion Energy, Energy Storage Systems, Electric Energy Systems, and Energy Conservation, pursuant to the Federal Nonnuclear Energy Research and Development Act of 1974 (Public Law 93-577), the Energy Reorganization Act of 1974 (Public Law 93-483), and the Department of Energy Organization Act (Public Law 95-91);

(2) recent developments in high-temperature superconducting materials hold great promise for highly efficient energy storage and transmission, medical diagnostics, magnets for physics research and fusion reactors, and smaller supercomputers;

(3) the United States is a world leader in basic research on high-temperature superconducting materials, and programs supporting this research at the Department of Defense, the National Science Foundation, and the Department of Energy should be maintained and strengthened;

(4) international interest in the commercialization of high-temperature superconducting materials is high and the key to success in commercialization lies in the rapid development of these materials and the identification of their applications; and

(5) the National Laboratories have demonstrated expertise in high-temperature superconductivity research and a proven record in research in enabling technologies which can benefit industrial efforts in product development.

SEC. 112. PURPOSES.

The purposes of this subtitle are—

(1) to provide for research on critical enabling technologies to assist United States industry in the commercialization of high-temperature superconductors;

(2) to provide national organization and coordination in the research, development and commercialization of high-temperature superconductors; and

(3) to encourage private industry, university, and National Laboratory interaction through centers for research on enabling technologies for high-temperature superconductivity at the National Laboratories.

SEC. 113. ESTABLISHMENT OF THE HIGH-TEMPERATURE SUPERCONDUCTOR RESEARCH INITIATIVE.

The Secretary of Energy shall initiate and carry out a cooperative program of research on enabling high-temperature superconductor technology and on the practical applications of such technology (hereafter in this subtitle referred to as the "Initiative").

SEC. 114. PARTICIPATION OF NATIONAL LABORATORIES.

(a) **MISSION OF NATIONAL LABORATORIES.**—The Secretary shall ensure that the National Laboratories participate in the Initiative, to the extent that such participation does not detract from the primary mission of any participating National Laboratory.

(b) **AGREEMENTS.**—The Secretary shall enter into such agreements with other Federal agencies, with United States private industrial or research organizations, or consortia, or with any college or university, as may be necessary to provide for the active participation of the National Laboratories in the Initiative.

(c) **REQUIRED PROVISIONS.**—The Initiative shall include provisions for one or more National Laboratories to conduct research and development activities relating to research on high-temperature superconductivity. Such activities may include research and development in associated technologies including thin film and bulk ceramic synthesis and processing and the characterization of physical, chemical, and structural properties in materials.

SEC. 115. FORMATION OF COUNCIL AND CENTERS FOR RESEARCH ON ENABLING TECHNOLOGIES.

(a) **COUNCIL.**—The Secretary of Energy shall form the "Council for Research on Enabling Technologies" (hereafter in this subtitle referred to as the "Council") that shall be composed of representatives of appropriate government agencies, universities, and industry to provide advice to the Secretary in setting goals and strategies for the Initiative. The Council shall recommend guidelines for the release of the technical findings and developments made by the cooperative research centers es-

tablished pursuant to subsection (b). Guidelines for releasing technical findings set forth by the Council shall be consistent with guidelines set forth by affected Federal agencies.

(b) **COOPERATIVE RESEARCH CENTERS.**—(1) The Secretary shall establish cooperative research centers in enabling technology for high-temperature superconducting materials and applications (hereafter in this subtitle referred to as "Centers") at one or more National Laboratories with appropriate university and private industry participants.

(2) The Centers shall be located at National Laboratories that demonstrate expertise in—

(A) high-temperature superconductivity research; and

(B) research in associated technologies including—

(i) thin film and bulk ceramic synthesis and processing; and

(ii) characterization of physical, chemical, and structural properties in materials.

(c) **AVOIDANCE OF DUPLICATION.**—The Council shall keep appraised of activities taking place at the existing Research Centers on Superconductivity and Superconductivity Pilot Centers. In carrying out the responsibilities of subsection (a), the Council shall recommend to the Secretary and such Centers measures to ensure that unnecessarily duplicative research or activities are not being carried out at these Centers.

SEC. 116. PERSONNEL EXCHANGES.

The Initiative may include provisions for temporary exchanges of personnel between any domestic firm or university referred to in this title and the National Laboratories that are participating in the Initiative. The exchange of personnel may be subject to such restrictions, limitations, terms and conditions as the Secretary considers necessary in the interest of national security.

SEC. 117. OTHER DEPARTMENT OF ENERGY RESOURCES.

(a) **AVAILABILITY OF RESOURCES.**—The Secretary shall make available to other departments or agencies of the Federal Government, and to any participant in research and development projects under the Initiative, any facilities, personnel, equipment, services, and other resources of the Department of Energy for the purpose of conducting research and development projects under the Initiative.

(b) **REIMBURSEMENT.**—The Secretary may make facilities available under this section only to the extent that the cost of the use of such facilities is reimbursed by the user.

SEC. 118. BUDGETING FOR HIGH-TEMPERATURE SUPERCONDUCTIVITY RESEARCH.

To the extent the Secretary considers appropriate and necessary, the Secretary, in preparing the research and development budget of the Department of Energy to be included in the annual budget submitted to the Congress by the President for fiscal years 1990, 1991, 1992, 1993, 1994, and 1995 under section 1105(a) of title 31, United States Code, shall provide for programs, projects, and activities that encourage the development of new technology in the field of high-temperature superconductivity.

SEC. 119. COST-SHARING AGREEMENTS.

(a) **PERMITTED PROVISIONS.**—The Secretary shall ensure that contracts for the operation of National Laboratories provide the director of each National Laboratory that is participating in the Initiative or the contractor operating any such National Laboratory the authority to receive funds under any cooperative research and development agreement entered into with a domestic firm or university under the Initiative.

(b) **CONSIDERATIONS.**—The director of each National Laboratory that is participating in the Initiative, in determining the type and extent of its laboratory participation in carrying out work for others, shall undertake such work only when facilities are available and when it would not interfere with Department of Energy programs, and such work shall be conducted in such a way as to not create a future detrimental burden on the National Laboratory.

(c) **LIMITATIONS.**—(1) An amount equal to not more than 10 percent of any National Laboratory's annual budget may be received from non-appropriated funds derived from work for others contracts entered into under the Initiative in any fiscal year, except to the extent approved in advance by the Secretary.

(2) Under subsection (a) no National Laboratory may receive from any person more than \$10,000,000 of non-appropriated funds under any cooperative research and development agreement entered into under the Initiative, except to the extent approved in advance by the Secretary.

SEC. 120. OVERSIGHT OF COOPERATIVE AGREEMENTS RELATING TO THE INITIATIVE.

(a) **PROVISIONS RELATING TO DISAPPROVAL AND MODIFICATION OF AGREEMENTS.**—(1) The Secretary may review a cooperative research and development agreement for the purpose of disapproving or requiring the modification of the cooperative research and development agreement. If the Secretary notifies the parties to the agreement of his intent to review the agreement, the agreement shall provide a 30-day period within which the agreement may be disapproved or modified beginning on the date the agreement is submitted to the Secretary.

(2) In any case in which the Secretary disapproves or requires the modification of any agreement presented under this section, the Secretary shall transmit a written explanation of such disapproval or modification to the head of the National Laboratory concerned.

(b) **RECORD OF AGREEMENTS.**—Each National Laboratory shall maintain a record of all agreements entered into under this subtitle section and submit such record to the Secretary on an annual basis.

SEC. 121. AVOIDANCE OF DUPLICATION.

In carrying out the Initiative, the Secretary shall ensure that unnecessarily duplicative research is not performed at the research facilities of the Department of Energy (including the National Laboratories) that are participating in the Initiative.

SEC. 122. INTERNAL REVENUE CODE TREATMENT.

(a) **TAX EXEMPTIONS.**—Any cooperative agreement, association, or consortium established by the Secretary or the National Laboratories is consistent with the purposes of this subtitle shall be treated as an organization described in section 501(c)(3) of the Internal Revenue Code of 1986 and shall be exempt from tax under section 501(a) of such Code with respect to activities under this subtitle.

(b) **BASIC RESEARCH PAYMENTS.**—Any amounts transferred to an organization described in paragraph (a) by a participating member of such an organization shall be taken into account as basic research payments for purposes of section 41(a)(2) of such Code.

(c) **CAPITAL GAINS TREATMENT.**—(1) No gain or loss shall be recognized in connection with the transfer pursuant to this subtitle of any patent, copyright, trademark, trade secret, mask work, or other intellectual property by or between an organization described in subsection (a) and any participating member of such an organization.

(2) If property is received in a transfer described in paragraph (1), the basis of the property in the hands of the transferee shall be the same as it would be in the hands of the transferor.

SEC. 123. ANTITRUST TREATMENT.

Any cooperative agreement, association, or consortia related by the Secretary or the National Laboratories under this subtitle, shall be considered a joint research and development venture within the meaning of section 2(a)(6) of the National Cooperative Research Act of 1984 (15 U.S.C. 4301 et seq.), for purposes of such Act.

SUBTITLE B—TECHNOLOGY MANAGEMENT AT THE DEPARTMENT OF ENERGY NATIONAL LABORATORIES

SEC. 131. FINDINGS AND PURPOSE.

(a) **FINDINGS.**—For purposes of this subtitle, Congress finds that—

(1) private industry has great interest in scientific collaboration with the National Laboratories but only if the present Department of Energy's present laboratory contracting process can be streamlined and intellectual property associated with joint ventures, adequately protected;

(2) contracts for the operation of the National Laboratories must provide the directors of such Laboratories with sufficient management authority for intellectual property to ensure that the director can negotiate with industry to set up cooperative research and development agreements;

(3) the authority provided to the directors of the National Laboratories should be subject to periodic audit and oversight by the Secretary, the Inspector General and the Comptroller General as well as Congress;

(4) there should be timely, consistent review procedure to ensure that commercialization potential is considered when software is developed under a Department of Energy contract or may have involved some Department of Energy funding;

(5) the National Laboratories must be perceived as "user-friendly" in order for industry to seriously consider the laboratories partners for collaborative research and development ventures;

(6) the National Laboratories must aggressively seek contact with private industries to ensure that they recognize the technical and scientific expertise resident in these laboratories, in addition to publicizing the availability of user facilities and technological projects in progress;

(7) the National Laboratories have demonstrated successes in technology transfer into the private sector but the effort can be significantly enhanced if—

(A) industry becomes more aware of the National Laboratory research and development projects and capabilities;

(B) technology transfer is considered a significant part of the National Laboratories' mission;

(C) the National Laboratories become better educated in industry market requirements; and

(D) industry gets involved with the National Laboratories early enough in the research and development process to direct development of commercially viable products; and

(8) nuclear weapons design, development, production, and maintenance comprise the primary mission of the Department of Energy nuclear weapons complex.

(b) **PURPOSE.** The purpose of this subtitle is to better meet the continuing responsibility of the Federal Government to ensure the full use of the results of the Nation's Federal investment in the National Laboratories' research and development in meeting international competition.

SEC. 132. DUTIES AND AUTHORITIES OF THE SECRETARY.

(a)(1) The Secretary shall review all existing regulations, policy guidelines, orders, directives, procedures, and administrative processes associated with the National Laboratories directors' ability to:

(A) enter into cooperative relationships and cooperative research and development agreements with private industry or universities;

(B) undertake work-for-others; and

(C) operate user facilities.

(2) The Secretary shall review existing standards for resolving potential conflicts of interest to ensure that such standards adequately establish guidelines for situations likely to arise through the use of the authorities granted in this title, including but not limited to cases where present or former National Laboratory employees or their partners negotiate licenses or assignments of titles to inventions or negotiate cooperative research and development agreements with Federal agencies (including the Department of Energy or the contractor-operator with which the employee involved is or was formerly employed).

(b) The Secretary shall—

(1) review the impact of the exchange of scientific information, scientific innovation, and commercialization resulting from cooperative research and development agreements.

(2) survey non-Federal parties interested in entering into cooperative research and development agreements with the National Laboratories to determine if adequate measures exist to encourage scientific innovation and commercialization resulting from cooperative research and development agreements; and

(3) based on the results of such review and survey develop policy recommendations that shall be submitted to the Congress.

(c) The Secretary shall—

(1) formulate and carry out a comprehensive set of policy guidelines to advance the goals of this title, based on the review under subsection (a);

(2) report to Congress and the President within ninety days after the date of the enactment of this title on the status of this review; and

(3) within one hundred and eighty days after the date of the enactment of this title, implement the policy guidelines under paragraph (1) that do not require regulations under section 142.

SEC. 133. POLICY.

It is the policy of Congress that—

(a) intellectual property rights in technology developed at the National Laboratories be managed so as to promote the competitiveness of United States industries;

(b) the Secretary prescribe regulations for cooperative research and development agreements and intellectual property rights arising under such agreements; and

(c) the directors of the National Laboratories devise implementing procedures consistent with the policy guidelines set forth by the Secretary.

SEC. 134. DEFINITIONS.

(a) For purposes of this subtitle, the term—

(1) "collaborative party" means a party to a cooperative research and development agreement as defined in section 102(e);

(2) "computer software" means recorded information, regardless of form or the media on which it may be recorded, comprising computer programs or documentation thereof;

(3) "director of a National Laboratory" means the Department of Energy contractor operator's employee who directs the management and operation of such National Laboratory;

(4) "intellectual property" means patents, trademarks, copyrights, mask works, and other forms of comparable property rights;

(5) "invention" means any invention that is or may be patentable or otherwise protected under title 35, United States Code, or any novel variety of plant that is or may be protected under the Plant Variety Protection Act (7 U.S.C. 2321 et seq.);

(6) "laboratory manager or operator" means the contractor who has signed a management and operating contract with the Secretary (but only with respect to activities relating to such management or operation);

(7) "laboratory owned" means any rights in intellectual property conveyed under this title to a contractor operating a National Laboratory or any rights in intellectual property arising under the operating contract for a National Laboratory where rights are not expressly taken by the United States Government or by a subcontractor;

(8) "made" when used in conjunction with any invention means the conception or first actual reduction to practice of such invention;

(9) "subject invention" means any invention of a National Laboratory first conceived or reduced to practice in the performance of work under a contract or funding agreement for the operation of a National Laboratory;

(10) "technical data" means recorded information of a scientific or technical nature regardless of form or the media on which it may be recorded;

(11) the term "third parties" means domestic entities located in the United States who agree to manufacture and to conduct research, and development substantially in the United States including—

(A) Federal agencies other than the Department of Energy;

(B) units of State or local government;

(C) industrial organizations, such as corporations, partnerships, limited partnerships, consortia, or industrial development organizations;

(D) public and private foundations;

(E) nonprofit organizations such as universities; and

(F) licensees of inventions, technical data, or computer software owned by the laboratory manager or operator.

SEC. 135. COOPERATIVE RESEARCH AND DEVELOPMENT AGREEMENTS.

(a) GENERAL AUTHORITY.—The Secretary shall prescribe regulations ensuring that the contract for the operation of any National Laboratory authorizes the director of such Laboratory:

(1) to enter into cooperative research and development agreements and to negotiate the terms and conditions of such agreements with—

(A) other Federal agencies;

(B) units of State or local government;

(C) industrial organizations including corporations, partnerships, and limited partnerships, consortia, and industrial development organizations;

(D) public and private foundations;

(E) nonprofit organizations including universities; or

(F) other persons including licensees of inventions, technical data or computer software owned by the National Laboratory.

(2) to negotiate intellectual property licensing agreements for National Laboratory owned inventions, technical data or computer software, assigned or licensed to the National Laboratory by third parties including voluntary assignment by employees.

(b) **SPECIFIC AUTHORITY.**—Each director of a National Laboratory may negotiate and include provisions in any cooperative research and development agreement entered into pursuant to this section permitting the laboratory manager or operator, on behalf of the United States to—

(1) accept, retain, and use funds, personnel, services, and property from collaborative parties and provide personnel, services, and property to collaborating parties;

(2) grant or agree to grant in advance to a collaborative party, intellectual property licenses or assignments, or options thereto, in any invention, technical data or computer software, made in whole or in part by an employee of a laboratory manager or operator under the cooperative research and development agreement; and

(3) to the extent consistent with Department of Energy regulations, orders, and directives pertaining to conflict of interest, permit employees or former employees of a laboratory manager or operator to participate in efforts to transfer to the private sector inventions, technical data or computer software, such employees developed or made while in the service of such laboratory manager or operator.

(c) In determining whether to enter into a cooperative research and development agreement the director of a National Laboratory shall determine that—

(1) facilities at the National Laboratory are available to do the work that is the subject of the cooperative research and development agreement;

(2) the work that is the subject of the cooperative research and development agreement would not interfere with Department of Energy programs;

(3) the work that is the subject of the cooperative research and development agreement would not create a future detrimental burden on the National Laboratory; and

(4) the proposed cooperative research and development agreement is consistent with applicable guidelines of the Secretary for cooperative research and development agreements.

(d) **APPROVAL OF AGREEMENT BY SECRETARY.**—The Secretary may disapprove or require the modification of an agreement under subsection (a). Such agreement shall provide a thirty-day period beginning on the date the agreement is presented to the Secretary by the director of the National Laboratory concerned, within which period such action may be taken by the Secretary. In any case in which the Secretary disapproves or requires the modification of any cooperative agreement presented under this section, the Secretary shall transmit a written explanation of such disapproval or modification to the director of the National Laboratory concerned. If such action is not taken within this thirty-day period, the cooperative research and development agreement shall be deemed approved.

(e) **LIMIT ON PERCENTAGE OF THE TOTAL WORK COOPERATIVE RESEARCH AND DEVELOPMENT AGREEMENTS CAN COMPRISE AT THE NATIONAL LABORATORIES.**—The cumulative total of nonappropriated funds received in any year under all agreements entered into by the director of any National Laboratory under this subtitle shall not exceed an amount equal to 10 per centum of the annual budget of such National Laboratory.

(f) **RECORDS OF AGREEMENTS.**—Each National Laboratory shall maintain a record of all agreements entered into under this subtitle, and shall submit it to the Secretary on an annual basis.

SEC. 136. AGREEMENT CONSIDERATIONS.

In deciding which cooperative research and development agreements to enter into, the director of a National Laboratory shall—

(a) give special consideration to small business firms and consortia involving small business firms;

(b) give preference to business units located in the United States that agree that products embodying inventions, technical data or computer software, made under the cooperative research and development agreement or produced through the use of such inventions, technical data or computer software, will be developed and manufactured substantially in the United States;

(c) in the case of any industrial organizations or other person subject to the control of a foreign company or government, as appropriate, take into consideration whether or not such foreign government permits United States agencies, organizations, or other persons to enter into cooperative research and development agreements and licensing agreements; and

(d) provide universities the opportunity to participate in such cooperative agreements when such participation will contribute to the purpose of this subtitle.

SEC. 137. PATENT OWNERSHIP AND THE CONDITIONS OF OWNERSHIP.

(a) **DISPOSAL OF TITLE TO INVENTIONS.**—Notwithstanding section 152 of the Atomic Energy Act of 1954 (42 U.S.C. 2182), section 9 of the Federal Nonnuclear Energy Research and Development Act of 1974 (42 U.S.C. 5908), or other provision of law, the Secretary shall dispose of the title to any subject invention made in the performance of a Department of Energy contract to operate any National Laboratory in the same manner as applied to small business and nonprofit organizations under chapter 18 of title 35, United States Code.

(b) **RETENTION OF TITLE BY UNITED STATES.**—(1) Whenever a manager or operator of a National Laboratory under a contract makes a subject invention to which the Secretary has determined (at the time of contracting for the management and operation of the National Laboratory) to retain title for exceptional circumstances under section 202(a)(ii) of title 35, United States Code, the title to the subject invention shall be retained by the Government unless the National Laboratory at which the invention is made requests title to such invention and the Secretary does not notify the director of the National Laboratory within ninety days after receipt of such request that the invention—

(A) is covered by a determination under such section 202(a)(ii); or

(B) has been classified or has been designated sensitive technical information as authorized by Federal statutes.

(2) Whenever a manager or operator of a National Laboratory under a contract makes a subject invention to which the Secretary has determined (at the time of contracting for the management and operation of the National Laboratory) to retain title because the invention is made in the course of or under a funding agreement described in section 202(a)(iv) of title 35, United States Code, the title to the subject invention shall be retained by the Government unless the National Laboratory at which the invention is made requests title to such invention and the Secretary does not notify the director of the National Laboratory within ninety days after receipt of such request that the invention—

(A) has been classified or has been designated sensitive technical information as authorized by Federal statutes; and

(B) is covered by a determination under such subsection 202(a)(iv).

(3) The Secretary may not use export control statutes or regulations as the sole basis for refusing a request for title to a subject invention.

(4) If the Secretary does not notify a National Laboratory that has requested title to a subject invention in accordance with this section, such Laboratory shall be deemed to have elected title to the invention under the Government-wide contractor patentable ownership provisions of chapter 18 of title 35, United States Code.

SEC. 138. SPECIAL RULE FOR WAIVER OF GOVERNMENT LICENSE RIGHTS.

Any of the rights of the Government or obligations of a National Laboratory described in chapter 18 of title 35, United States Code, including the license reserved in section 202(c)(4) of title 35, United States Code, may be waived or omitted if the Secretary determines that the interests of the United States and the general public will be better served or the objectives and policies of this subtitle will be better promoted by such waiver or omission. A waiver or omission shall be considered—

(1) if it is necessary to obtain a uniquely or highly qualified contractor; or

(2) if such waiver or omission relates to a subject invention involving cosponsored, cost sharing or joint venture research and development, and the contractor, cosponsor or joint venturer is making substantial contribution of funds, facilities, or equipment to the work performed on such invention; or

(3) if the subject invention will require substantial additional investment in development before a product is created and it is expected that the primary market for such product is the United States Government.

SEC. 139. INTELLECTUAL PROPERTY CONTRACT PROVISIONS.

(a) **CONTRACT PROVISIONS.**—Any Department of Energy funding agreement to operate a National Laboratory shall provide—

(1) that any royalties or income that is earned by the manager or operator of a National Laboratory from the licensing of laboratory-owned intellectual property rights in any fiscal year shall be used as authorized under subsection 202(c)(7)(E) of title 35, United States Code and section 13(a)(1)(B)(i)-(iv) and section 13(a)(2)-(4) of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3710c(a)(1)(B)(i)-(iv) and 3710c(a)(2)-(4); and

(2) that the costs of obtaining and protecting intellectual property rights in any invention, technical data, or computer software, owned by the National Laboratory shall be paid for by such National Laboratory as a cost shared expense under a cooperative research and development agreement.

(b) The Secretary shall establish procedures to have the management of intellectual property rights, including procurement and retention of such rights as well as licensing of such rights, in connection with laboratory-owned inventions, commercially valuable technical data, and computer software shall be the responsibility of the director of the National Laboratory at which the invention, technical data, or computer software are made, developed, or assigned.

(c) The Secretary shall prescribe regulations, orders, or directives prohibiting any manager or operator of a National Laboratory who has received title to intellectual property under this section from receiving money or other benefit from the use or licensing of such property for the benefit of the laboratory manager or operator, except for research and development associated with activities at the National Laboratory to promote technology transfer as authorized by law, or in special circumstances, as may be approved by the appropriate Department of Energy manager of the Operations Office.

(d) COMPENSATION.—(1) Subject to paragraph (2), in return for retaining title to any intellectual property rights in any invention or discovery made in performance of a Department of Energy cooperative research agreement, the manager or operator of any National Laboratory contractor shall pay to the United States reasonable compensation based on the value of the technology transferred. The amount of the payment arising as a result of the transfer shall be set by an arbitration board consisting of one member selected by the contractor, one member selected by the Secretary, and one member jointly selected by the contractor and the Secretary. In determining the payment, the arbitration boards shall set an amount that is proportionate with the research and development costs funded by the United States. The arbitration board shall have discretion to permit the payment to be made in installments according to the extent the contractor uses or employs the intellectual property.

(2) Paragraph (1) shall not apply if—

(A) the contractor is operating the National Laboratory for no profit or fee beyond expenses; and

(B) such contractor is offering the intellectual property for fair market value and any value or royalties the contractor derives from the intellectual property will be returned to the National Laboratory or the Federal Treasury in accordance with section 202(c)(7)(E) of title 35, United States Code.

SEC. 140. MARCH-IN RIGHTS.

The Secretary may require the licensing to third parties of all intellectual property owned by the laboratory manager or operator that is subject to the provisions of this title in the same manner as provided under section 203 of title 35, United States Code.

SEC. 141. OVERSIGHT.

The Secretary, the Inspector General of the Department of Energy, and the Comptroller General shall conduct periodic audits of activities of the National Laboratory under this subtitle.

SEC. 142. REGULATIONS.

(a) Within one hundred and eighty days after the date of enactment of this subtitle, the Secretary shall prescribe regulations for implementing sections 135, 137, and 139. In prescribing regulations under this section the Secretary shall provide opportunity for public comment on proposed regulations.

(b) Any regulations under this section shall be guided by the purpose of this subtitle.

(c) Before the Secretary issues regulations under this section, the Office of Federal Procurement Policy shall review such regulations for consistency with this subtitle.

SEC. 143. EFFECTIVE DATE.

This subtitle shall take effect on the date of enactment. The Secretary shall immediately enter into negotiations with the contractors of the National Laboratories to amend all existing contracts for the operation of the National Laboratories, to reflect this subtitle. Pending such amendment, the provisions of this subtitle shall govern the disposition of all intellectual property rights covering laboratory-owned inventions, technical data, and computer software, generated in performance of Department of Energy contracts for the operation of the National Laboratories.

TITLE II—RENEWABLE ENERGY AND ENERGY EFFICIENCY

SECTION 201. SHORT TITLE.

This title may be cited as the "Renewable Energy and Energy Efficiency Technology Competitiveness Act of 1988".

SEC. 202. FINDINGS AND PURPOSE.

(a) FINDINGS.—For purposes of this title, Congress finds that—

(1) a secure and diverse supply of energy is in the Nation's best interest, and it is appropriate for the Federal Government to sponsor a balanced program of energy research and energy technology development and demonstration to insure diverse supplies of energy by the year 2000;

(2) a strategic plan to pursue a program that balances Federal investments among energy supply and technology options is needed to assure that a well-managed, cost-effective research, development, and demonstration program will be implemented;

(3) renewable energy resources and energy efficiency technologies can make the energy sources of the United States secure and diverse with minimal environmental risks;

(4) the development and use of renewable energy and energy efficiency technologies can significantly reduce United States dependence on foreign energy sources; however, the extent of such contribution is dependent upon increasing efficiencies and reducing costs of renewable energy and energy efficiency technologies;

(5) the technological lead of United States firms and their capability to compete with foreign renewable energy and energy efficiency technology has declined in recent years, and many foreign firms are selling renewable energy and energy efficiency technology in the United States;

(6) competitiveness of United States firms overseas depends in part on long-term stable Federal support of research and development efforts to maintain United States preeminence in technology; it is appropriate for the Federal Government to support near-term commercial and proof-of-concept demonstrations so that United States firms will have not only technology, but also products to market;

(7) the development and export of renewable energy and energy efficiency products and technology can contribute positively to the balance of trade; and

(8) the volatility of world energy markets underscores the need for sustained levels of support for the research and development of renewable energy and energy efficiency technologies.

(b) PURPOSE.—It is the purpose of this title to direct the Secretary of Energy, acting in accordance with authority contained in the Federal Nonnuclear Energy Research and Development Policy Act of 1974 (42 U.S.C. 5901-5920) and other law applicable to the Secretary, to pursue an aggressive national program of research, development, and demonstration of renewable energy and energy efficiency technologies in order to ensure a stable and secure future energy supply by—

(1) providing a long-term stable environment for renewable energy and energy efficiency technology research and development activities through the establishment of long-term goals and multiyear funding levels;

(2) directing the Secretary to undertake initiatives to hasten the commercialization in the near term of renewable energy and energy efficiency technologies; and

(3) fostering collaborative research and development efforts involving the private sector through government support of a vigorous program of innovative joint research and development venture projects.

SEC. 203. DEFINITIONS.

As used in this title, the term—

(1) "Secretary" means the Secretary of Energy; and

(2) "joint research and development venture" means a joint research and development venture under the National Cooperative Research Act of 1984 (98 Stat. 1815).

SEC. 204. NATIONAL GOALS AND MULTI-YEAR FUNDING FOR FEDERAL WIND, PHOTOVOLTAICS AND SOLAR THERMAL PROGRAMS.

(a) NATIONAL GOALS.—The following are declared to be the national goals for the wind, photovoltaics and solar thermal energy programs currently being carried out by the Secretary under existing law:

(1) WIND.—(A) In general, the goals for the Wind Energy Research Program include improving design methodologies and developing more reliable and effi-

cient wind turbines to increase the cost competitiveness of wind energy. Research efforts shall emphasize—

(i) activities that address near-term technical problems and permit exploitation of current market opportunities of the wind energy industry;

(ii) developing advanced airfoils and variable speed generators to increase wind turbine output and reduce maintenance costs by decreasing structural stress and fatigue;

(iii) increasing the basic knowledge of aerodynamics, structural dynamics, fatigue and electrical systems interactions as applied to current wind energy technology; and

(iv) improving the compatibility of electricity produced from windfarms with conventional utility needs.

(B) Specific goals for the Wind Energy Research Program shall be to—

(i) reduce average wind energy costs to 3 to 5 cents per kilowatt hour by 1995;

(ii) reduce capital costs of new wind energy systems to \$500 to \$700 per kilowatt of installed capacity by 1995;

(iii) increase installed wind generating capacity to 4,000 to 8,000 megawatts by 1995;

(iv) reduce operation and maintenance costs for wind energy systems to less than 1.0 cents per kilowatt hour by 2,000; and

(v) increase capacity factors for new wind energy systems to 25 to 30 per centum by 1995.

(2) PHOTOVOLTAICS.—(A) In general, the goals of the Photovoltaic Energy Systems Program shall include improving the reliability and conversion efficiencies and lowering the costs of photovoltaic conversion. Research efforts shall emphasize advancements in the performance, stability and durability of photovoltaic materials.

(B) Specific goals of the Photovoltaic Energy Systems Program shall be to—

(i) improve operational reliability of photovoltaic modules to thirty years by 1995;

(ii) increase photovoltaic conversion efficiency of new photovoltaic amorphous silicon modules to 15 percent by 1995;

(iii) decrease new photovoltaic module direct manufacturing costs to \$800 per kilowatt by 1995; and

(iv) increase installed capacity of photovoltaic electric power production capacity to 100 to 200 megawatt by 1991.

(3) SOLAR THERMAL.—(A) In general, the goal of the Solar Thermal Energy Systems Program shall be to advance research and development to a point where solar thermal technology is cost-competitive with conventional energy sources and to promote the integration of this technology into the production of industrial process heat and the conventional utility network. Research and development shall emphasize development of a thermal storage technology to provide capacity for shifting power to periods of demand when full insolation is not available; improvement in receivers, energy conversion devices, and innovative concentrators using stretch membranes, lenses and other materials; and exploration of advanced manufacturing techniques.

(B) Specific goals of the Solar Thermal Energy Systems Program shall be to—

(i) reduce solar thermal costs for industrial process heat to \$ per million Btu; and

(ii) reduce average solar thermal costs for electricity to 4 to 6 cents per kilowatt hour.

(4) The President's budget request for fiscal year 1991 shall contain the Secretary's recommendations for specific cost, installed capacity, and other pertinent goals for 1995 for Department of Energy research, development, and demonstration programs in Biofuels Energy Systems, Solar Buildings Energy Systems, Ocean Energy Systems and Geothermal Energy.

(b) AUTHORIZATION.—There is authorized to be appropriated to the Secretary—

(1) for the Wind Energy Research Program, an amount not to exceed \$19,000,000 in fiscal year 1990; \$22,000,000 in fiscal year 1991; and \$26,000,000 in fiscal year 1992;

(2) for the Photovoltaic Energy Systems Program an amount not to exceed \$43,100,000 in fiscal year 1990; \$45,000,000 in fiscal year 1991; and \$50,000,000 in fiscal year 1992;

(3) for the Solar Thermal Energy Systems Program, an amount not to exceed \$28,700,000 in fiscal year 1990; \$32,000,000 in fiscal year 1991; and \$35,000,000 in fiscal year 1992;

(4) for the Biofuels Energy Systems Program, an amount not to exceed \$32,100,000 in fiscal year 1990; \$35,100,000 in fiscal year 1991; and \$40,000,000 in fiscal year 1992;

(5) for the Solar Buildings Energy Systems Program, an amount not to exceed \$8,000,000 in fiscal year 1990; \$9,000,000 in fiscal year 1991; and \$10,000,000 in fiscal year 1992;

(6) for the Ocean Energy Systems Program, an amount not to exceed \$5,000,000 in fiscal year 1990; \$5,000,000 in fiscal year 1991; and \$5,000,000 in fiscal year 1992; and

(7) for the Geothermal Program, an amount not to exceed \$34,900,000 in fiscal year 1990; \$38,700,000 in fiscal year 1991; and \$35,700,000 in fiscal year 1992.

(c) **PROJECTS.**—(1) The President's budget request for fiscal year 1992 shall include the Secretary's recommendations for at least one proposed proof-of-concept or near-commercial demonstration project in each of the categories represented by paragraphs (1), (2), and (3) of subsection (b). Each proposed project shall be described in sufficient detail to support congressional authorization and solicitation of bids for construction of necessary facilities.

(2) A list and description of alternative project plans under this subsection shall be submitted in the President's fiscal year 1991 budget request. Such plans shall require funding or in-kind contributions from private sources in support of up to 50 per centum of total project costs.

(3) In selecting projects under this subsection, the Secretary shall take into account the extent to which such projects will contribute to earlier commercialization of key technologies within such categories than might occur without Federal support under this subsection and the extent to which such projects will contribute to the competitiveness of United States firms engaged in international trade in renewable energy technologies.

(d) **REPORT ON OPTIONS.**—On or before May 1, 1991, the Secretary shall submit to Congress a report analyzing options available to the Secretary under existing law to accelerate the timely commercialization of wind, photovoltaic, solar thermal, bio-fuels, biomass, solar buildings, ocean and geothermal renewable energy technologies through emphasis on development and demonstration assistance to specific technologies in the research, development, and demonstration programs of the Department of Energy that are near commercial application.

(e) **AMENDED GOALS.**—Whenever the Secretary determines that any of the goals established under this section is no longer appropriate, he shall notify Congress of the reason for the determination and provide an amended goal that is consistent with the purposes of this title.

SEC. 205. ENERGY EFFICIENCY RESEARCH AND DEVELOPMENT.

(a) **NEW INITIATIVES.**—The President's budget request for fiscal years 1991 and 1992 shall include the Secretary's recommendations of amounts to be set aside for new initiatives in energy efficiency research, development, and demonstration. Funds made available for new initiatives shall supplement and not supplant funds available to complete ongoing energy efficiency research, development, and demonstration projects supported in whole or in part by the Secretary during fiscal year 1990. Funds made available for new initiatives shall be used by the Secretary to support the most promising and deserving new ideas in energy efficiency research, development, and demonstration brought to the attention of the Secretary during the previous fiscal year.

(b) **AUTHORIZATIONS.**—

(1) **FISCAL YEAR 1990.**—There is hereby authorized to be appropriated to the Secretary for the energy efficiency research, development, and demonstration programs of the Secretary, an amount not to exceed \$187,137,000 in fiscal year 1990, of which \$20,250,000 shall be available for new initiatives, as set forth below—

(A) for transportation energy efficiency research, development, and demonstration, there is authorized to be appropriated to the Secretary an amount not to exceed \$58,200,000, of which \$3,200,000 shall be made available for new initiatives;

(B) for industrial energy efficiency research, development, and demonstration, there is authorized to be appropriated to the Secretary an amount not to exceed \$42,300,000, of which \$5,800,000 shall be available for new initiatives;

(C) for buildings and community systems energy efficiency research, development, and demonstration, there is authorized to be appropriated to the

Secretary an amount not to exceed \$51,975,000, of which \$9,250,000 shall be available for new initiatives;

(D) for multi-sector energy efficiency research, development, and demonstration, there is authorized to be appropriated to the Secretary an amount not to exceed \$33,000,000, of which \$2,000,000 shall be available for new initiatives; and

(E) for energy efficiency research, development, and demonstration policy and management, there is authorized to be appropriated to the Secretary an amount not to exceed \$1,662,000.

(2) FISCAL YEAR 1991.—There is hereby authorized to be appropriated to the Secretary for the energy efficiency research, development, and demonstration programs of the Secretary, an amount not to exceed \$201,403,000 in fiscal year 1991, of which \$6,000,000 shall be available for new initiatives, as set forth below:

(A) for transportation energy efficiency research, development, and demonstration, there is authorized to be appropriated to the Secretary an amount not to exceed \$63,200,000, of which \$2,000,000 shall be made available for new initiatives;

(B) for industrial energy efficiency research, development, and demonstration, there is authorized to be appropriated to the Secretary an amount not to exceed \$45,000,000, of which \$1,000,000 shall be available for new initiatives;

(C) for buildings and community systems energy efficiency research, development, and demonstration, there is authorized to be appropriated to the Secretary an amount not to exceed \$55,775,000, of which \$2,000,000 shall be available for new initiatives;

(D) for multisector energy efficiency research, development, and demonstration, there is authorized to be appropriated to the Secretary an amount not to exceed \$35,700,000, of which \$1,000,000 shall be available for new initiatives; and

(E) for energy efficiency research, development, and demonstration, there is authorized to be appropriated to the Secretary an amount not to exceed \$1,728,000.

(3) FISCAL YEAR 1992.—There is hereby authorized to be appropriated to the Secretary for the energy efficiency research, development, and demonstration programs of the Secretary, an amount not to exceed \$209,147,000 in fiscal year 1992, of which \$6,000,000 shall be available for new initiatives, as set forth below:

(A) for transportation energy efficiency research, development, and demonstration, there is authorized to be appropriated to the Secretary an amount not to exceed \$65,460,000, of which \$2,000,000 shall be made available for new initiatives;

(B) for industrial energy efficiency research, development, and demonstration, there is authorized to be appropriated to the Secretary an amount not to exceed \$46,740,000, of which \$1,000,000 shall be available for new initiatives;

(C) for buildings and community systems energy efficiency research, development, and demonstration, there is authorized to be appropriated to the Secretary an amount not to exceed \$58,100,000, of which \$2,000,000 shall be available for new initiatives;

(D) for multisector energy efficiency research, development, and demonstration, there is authorized to be appropriated to the Secretary an amount not to exceed \$37,050,000, of which \$1,000,000 shall be available for new initiatives; and

(E) for energy efficiency research, development, and demonstration policy and management, there is authorized to be appropriated to the Secretary an amount not to exceed \$1,797,000.

SEC. 206. JOINT RESEARCH AND DEVELOPMENT VENTURES.

(a) FINDINGS AND PURPOSE.—

(1) FINDINGS.—For purposes of this section, Congress finds that joint research and development ventures can—

(A) improve coordination in technology development among firms in industries attempting to commercialize renewable energy and energy efficiency technologies;

(B) assist in setting national standards to improve the operation of markets for these technologies; and

(C) enhance the ability of domestic firms to compete with foreign enterprises in sales of renewable energy and energy efficiency technologies.

(2) PURPOSE.—The purpose of this section is to direct the Secretary of Energy to make use of joint research and development ventures to further commercialization of renewable energy and energy efficiency technologies.

(b) ESTABLISHMENT.—

(1) The Secretary shall establish six joint research and development ventures in accordance with the provisions of this section. Each joint research and development venture under this section shall include manufacturing firms, investors, an advisory committee appointed in accordance with this section, and such other participation as the Secretary deems appropriate to achieve the purposes of this section. Any facilities constructed under this section shall be located in the United States, Puerto Rico, the Virgin Islands, or the territories and possessions of the United States.

(2) The Secretary shall establish at least one joint research and development venture in accordance with subsection (c) to develop technology and expertise in each of the following areas—

- (A) photovoltaics technology;
- (B) wind energy technology;
- (C) solar thermal technology;
- (D) factory-made housing;
- (E) advanced district cooling technology; and
- (F) renewable energy and energy efficiency technology exports.

(3) Not later than one hundred and eighty days after the date of the enactment of this section the Secretary shall publish plans to implement this section and report to Congress on such plans.

(c) VENTURES.—

(1) PHOTOVOLTAICS TECHNOLOGY.—(A) The Secretary shall establish and provide financial assistance to a joint research and development venture for the development of high-efficiency thermal and electrical distribution, storage, and end-use systems employing electricity from photovoltaic conversion of solar energy that may be deployed in remote or rural areas, including villages in developing countries.

(B) The purpose of the venture under subparagraph (A) shall be to design, test, and demonstrate an integrated, cost efficient energy system, including components for electrical and thermal production, conversion, distribution, storage, and use under electronic control.

(C) Subsystems of the energy system under this paragraph may include—

- (i) advanced photovoltaic concentrators or other photovoltaic arrays;
- (ii) an electronically controlled electrical system;
- (iii) a potable water desalination system employing multistage flash distillation technology; and
- (iv) a small scale refrigeration system employing a low-temperature chiller driven by waste heat from the village energy system or by photovoltaic arrays.

(D) The Secretary shall appoint members to an Advisory Committee on Photovoltaic Village Energy Systems to assist the Secretary in carrying out his responsibilities with respect to the joint venture under this paragraph. Such committee shall include at least one member representing each of the following—

- (i) firms in the photovoltaic manufacturing industry;
- (ii) the Secretary of Commerce;
- (iii) the Director of the Agency for International Development;
- (iv) the Director of the Export-Import Bank;
- (v) the Electric Power Research Institute;
- (vi) the Solar Energy Research Institute; and
- (vii) such other groups or institutions as the Secretary deems appropriate.

(E) There is authorized to be appropriated to the Secretary a total of not more than \$1,200,000 for each of the fiscal years 1990, 1991, and 1992 to carry out the purposes of this paragraph.

(2) WIND ENERGY TECHNOLOGY.—(A) The Secretary shall establish and provide financial assistance to a joint research and development venture for the development of high-efficiency thermal and electrical distribution, storage, and end-use systems employing wind-diesel systems designed for use where diesel generation of electricity currently is being used at a remote or rural site with significant wind energy potential.

(B) The purpose of the venture under subparagraph (A) shall be to design, test, and demonstrate an integrated, cost-efficient wind-diesel energy system in-

cluding components for electrical and thermal production, conversion, distribution, storage, and use under electronic control.

(C) Subsystems of the energy system under this paragraph may include—

- (i) a diesel generator operating in conjunction with one or more wind turbines;
- (ii) an electronically controlled electrical system;
- (iii) a potable water desalination system employing multistage flash distillation technology; and
- (iv) a small scale refrigeration system employing a low-temperature chiller driven by excess wind generated energy or a combination of wind-generated and diesel-generated energy.

(D) The Secretary shall appoint members to an Advisory Committee on Wind Energy Village Energy Systems to assist the Secretary in carrying out his responsibilities with respect to the joint venture under this paragraph. Such committee shall include at least one member representing each of the following—

- (i) firms in the wind energy equipment manufacturing industry;
- (ii) the Secretary of Commerce;
- (iii) the Director of the Agency for International Development and;
- (iv) the Director of the Export-Import Bank;
- (v) the Electric Power Research Institute;
- (vi) the Solar Energy Research Institute; and
- (vii) such other groups or institutions as the Secretary deems appropriate.

(E) There is authorized to be appropriated to the Secretary a total of not more than \$1,200,000 for each of the fiscal years 1990, 1991, and 1992 to carry out the purposes of this paragraph.

(3) SOLAR THERMAL TECHNOLOGY.—(A) The Secretary shall establish and provide financial assistance to a joint research and development venture for the efficient use of solar thermal energy deployed in planned communities in the United States and overseas as a total energy system for the supply of electricity, industrial energy, potable water, refrigeration, and community heating and cooling needs, and the treatment of community-generated wastes.

(B) The purpose of the venture under paragraph (A) shall be to design, test and demonstrate an integrated, cost-effective community total energy system including components for thermal production, conversion, distribution, storage, and use under automated control.

(C) Subsystems of the community total energy system under this paragraph may include—

- (i) advanced solar thermal concentrators;
- (ii) a potable water desalination system employing advanced thermal distillation technology;
- (iii) an automated energy distribution and control system;
- (iv) a thermally driven solar refrigeration system; and
- (v) advanced waste treatment systems using thermal energy or direct concentrated solar flux.

(D) The Secretary shall appoint members to an Advisory Committee on Solar Thermal Community Total Energy Systems to assist the Secretary in carrying out his responsibilities with respect to the joint venture under this paragraph. Such committee shall include at least one member representing each of the following—

- (i) firms in the solar thermal manufacturing industry;
- (ii) the Secretary of Commerce;
- (iii) the Director of the Agency for International Development;
- (iv) the Director of the Export-Import Bank;
- (v) the Electric Power Research Institute;
- (vi) the Gas Research Institute;
- (viii) the Solar Energy Research Institute; and
- (ix) such other groups or institutions as the Secretary deems appropriate.

(E) There is authorized to be appropriated to the Secretary a total of not more than \$900,000 for each of the fiscal years 1990 through 1992 to carry out the purposes of this paragraph.

(4) FACTORY-MADE HOUSING.—(A) For purposes of this paragraph Congress finds that—

- (i) the United States is moving toward the industrialization of homebuilding;
- (ii) 90 per centum of new homes have factory-made components and over four hundred thousand of the approximately two million homes built each year are largely factory-made;

(iii) the United States is facing competition from foreign home builders who make use of factory-made housing techniques;

(iv) foreign firms have begun to penetrate United States markets for homes and housing-related products, while United States exports in these categories have stagnated;

(v) housing construction and materials comprises 21 per centum of the gross national product;

(vi) the Office of Technology Assessment has found that the technological innovations that could improve the quality and reduce the cost of housing in the United States are being needlessly slowed by inadequate research and development;

(vii) the Department of Commerce has warned that foreign competitors have targeted the United States market for residential construction in the same way that domestic markets for automobiles and steel have been targeted in the past; and

(viii) a joint research and development venture supported in part by the Federal government is needed to assist the United States home building industry in competing with housing products and technology from overseas.

(B) The Secretary shall establish and provide financial assistance to a joint research and development venture with such specialized private firms and investors as the Secretary deems appropriate in order to establish at least three regional centers to develop techniques to improve the energy performance of factory-made housing offered by United States firms. In locating the regional centers under this paragraph, the Secretary shall consider regional differences in housing needs, housing design, construction technique, marketing practices, and construction materials.

(C) The regional centers under this paragraph shall carry out research, development, and demonstration efforts to improve the quality, energy efficiency, and adaptability to renewable forms of energy of factory-made housing offered for sale in the United States and the productivity and energy efficiency of the housing construction process. The research, development, and demonstration programs at these centers shall consider housing design, fabrication, delivery systems, construction processes, marketing, and product export.

(D) The research, development, and demonstration strategy under this paragraph shall be guided by—

(i) a detailed characterization of the needs of the home building industry;

(ii) a close working relationship with all sectors of the home building industry; and

(iii) coordination among the centers to pool and conserve resources.

(E) The Secretary shall appoint members to an Advisory Committee on Energy Performance in Factory-Made Housing to assist the Secretary in carrying out his responsibilities with respect to the joint research and development venture established under this paragraph. Such committee shall include at least one member representing each of the following—

(i) the Secretary of Housing and Urban Development;

(ii) the Secretary of Commerce;

(iii) the National Institute of Building Sciences;

(iv) the National Association of Home Builders;

(v) the National Laboratories of the Department of Energy;

(vi) the National Bureau of Standards; and

(vii) such other groups or institutions as the Secretary deems appropriate.

(F) There is authorized to be appropriated to the Secretary a total of not more than \$10,000,000 for each of the fiscal years 1990 through 1992 to carry out the purposes of this paragraph.

(5) **ADVANCED DISTRICT COOLING TECHNOLOGY.**—(A) The Secretary shall establish and provide financial assistance to a joint research and development venture with such specialized private firms and investors as the Secretary deems appropriate in order to develop advanced district cooling technologies that are applicable in cities with high cooling loads.

(B) The joint research and development venture under this paragraph shall—

(i) develop technical strategies for decreasing the capital cost and increasing the energy efficiency of major district heating and cooling system components;

(ii) encourage the use of cogeneration and renewable energy technologies in district heating and cooling; and

(iii) assist in transfer of district heating and cooling technology to local governments.

(C) The Secretary shall select three cities for application of advanced district cooling technologies developed by the joint venture under this paragraph. The activities to be carried out in such application shall include district cooling assessment, feasibility, and engineering design studies.

(D) The Secretary shall appoint members to an Advisory Committee on Advanced District Cooling Technology to assist the Secretary in carrying out his responsibilities with respect to the joint research and development venture under this paragraph. Such Committee shall include at least one member representing each of the following—

- (i) the Secretary of Housing and Urban Development;
- (ii) the Secretary of Commerce;
- (iii) firms manufacturing district cooling equipment;
- (iv) the National League of Cities; and
- (v) such other groups or institutions as the Secretary deems appropriate.

(E) There is authorized to be appropriated for each of the fiscal years 1990 through 1992 not more than \$1,000,000 per year to carry out the purposes of this paragraph.

(6) EXPORT TECHNOLOGY PROJECTS.—(A) For purposes of this paragraph Congress finds that—

(i) the United States has several advanced energy efficiency and renewable energy technologies that lack only sufficient coordination, support, and emphasis to become important export items capable of reducing the United States' trade deficit;

(ii) a major barrier to export of energy efficiency and renewable energy technology is the lack of information on overseas markets and technology development by foreign competitors;

(iii) the industry that markets energy efficiency technology is highly fragmented, and the renewable energy industry is comprised of small firms that lack the necessary resources to identify and target overseas markets; and

(iv) a joint research and development venture is needed to bring together a broad array of manufacturing firms, financial institutions, and Federal agencies to identify and develop promising technologies and export markets for energy efficiency and renewable energy technologies.

(B) The Secretary shall establish and provide financial assistance to a joint research and development venture with such specialized private firms and investors as the Secretary determines appropriate for the purpose of improving energy efficiency and renewable energy manufacturing processes in order to enhance product reliability and cost competitiveness relative to foreign-made products. The joint venture under this paragraph shall be coordinated with research, assessment, and targeting of foreign markets for energy efficiency and renewable energy products.

(C) The Secretary shall appoint members to an Advisory Committee on Energy Conservation and Renewable Energy Technology Exports to assist the Secretary in carrying out his responsibilities with respect to the joint research and development venture under this paragraph. Such committee shall include at least one member representing each of the following—

- (i) the Secretary of Commerce;
- (ii) the Director of the Agency for International Development;
- (iii) the Director of the Export-Import Bank;
- (iv) the United States Export Council for Renewable Energy;
- (v) the National Laboratories of the Department of Energy; and
- (vi) such other groups or institutions as the Secretary deems appropriate.

(D) There is authorized to be appropriated to the Secretary to carry out the purposes of this paragraph a total amount for each of the fiscal years 1990 through 1992 not to exceed \$5,000,000 with respect to renewable energy activities under this paragraph and \$5,000,000 with respect to energy efficiency activities under this paragraph.

SEC. 207. RENEWABLE ENERGY EXPORTS.

(a) FINDINGS AND PURPOSE.—(1) For purposes of this section, Congress finds that—

(A) Among the major problems in promoting exports of renewable energy technology are the lack of available information on overseas markets and the absence of financing for the purchase of the technologies; and

(B) the Committee Renewable Energy, Commerce, and Trade ("CORECT") established under the Renewable Energy Industry Development Act (Public Law 98-370) currently coordinates Federal Government activities to promote renewable energy exports.

(2) The purpose of this section is to evaluate current efforts to promote exports of renewable energy technology; to establish a joint government-industry plan to identify promising technologies and increase the financing available for exports of renewable energy technologies, to target potential markets for these technologies, and to authorize funding of these activities.

(b) **REVIEW OF CORECT.**—In order to provide reliable information on overseas markets for renewable energy technology, the Secretary shall review the activities of the Committee on Renewable Energy, Commerce, and Trade in order to determine if current efforts by such Committee to promote exports of renewable energy technology are sufficient and whether additional efforts are necessary. The Secretary shall report to Congress the results of such review within six months after the date of the enactment of this Act.

(c) **REPORT.**—Each participating member of the Committee on Renewable Energy, Commerce, and Trade shall report annually to Congress on the actions of such agency during the previous fiscal year to achieve the purposes of the Committee on Renewable Energy, Commerce, and Trade and of this section. Such report shall describe the exports of renewable energy technology that have occurred as a result of such agency actions.

(d) **PLAN.**—The Committee on Renewable Energy, Commerce, and Trade shall—

(1) establish a joint government-industry plan to maintain or increase the market share of the United States in international trade in renewable energy technologies, including technologies for production of alcohol fuels, biomass energy, geothermal energy, wood energy and in technologies for passive solar energy conversion, photovoltaics, solar thermal energy conversion and wind energy conversion. Such plan shall include guidelines for agencies that are members of the Committee with respect to the financing of exports of such renewable energy technologies;

(2) develop, in consultation with representatives of affected industries, administrative guidelines for Federal export loan programs to simplify application by firms seeking export assistance for renewable energy technologies from agencies implementing such programs; and

(3) target renewable energy technology markets for primary emphasis by Federal export loan programs, development programs, and private sector assistance programs.

(e) **AUTHORIZATIONS.**—There is hereby authorized to be appropriated to the Secretary for activities of the Committee on Renewable Energy, Commerce, and Trade an amount not to exceed—

- (1) \$1,500,000 in fiscal year 1990;
- (2) \$2,200,000 in fiscal year 1991; and
- (3) \$2,500,000 in fiscal year 1992.

SEC. 208. RENEWABLE ENERGY.

(a) **Dissemination of Information.**—Section 523 of the National Energy Conservation Policy Act (42 U.S.C. 8243) is amended by adding a new subsection (d) as follows:

“(d) In order to more widely disseminate information about the program under this part and under part 3 and the benefits of solar heating and solar heating and cooling technology, the Secretary shall establish a program to disseminate such information for Federal procurement officers and Federal loan officers that shall include site visits and technical briefings. The Secretary shall utilize available funds for the program under this subsection.”

(b) **RENEWABLE ENERGY IN THE CARIBBEAN INITIATIVE.**—Section 212(c)(7) of the Caribbean Basin Economic Recovery Act (97 Stat. 387; 19 U.S.C. 2703(c)(7)) is amended to read as follows:

“(7) the degree to which such country is undertaking self-help measures to promote its own economic development and energy self-sufficiency using locally available renewable resources;”

(c) **DEPARTMENT OF DEFENSE HOUSING.**—Section 2857(b)(1) of title 10, United States Code, is amended by inserting after “has the potential for” the following: “reduced energy costs”

(d) **EXPORT-IMPORT BANK LOANS.**—Section 7 of the Export-Import Bank Act of 1945 (12 U.S.C. 635e) is amended by adding at the end thereof the following:

“(c)(1) Not less than 0.025 per centum of the loan authority of the Bank in any fiscal year shall be available only for solar and renewable energy loans.

“(2) The President of the Bank may waive the requirements of paragraph (1) if he determines, after June 30 of the fiscal year in question, that the Bank is unlikely to receive during such fiscal year a sufficient number of qualified proposals to exhaust

the loan authority made available for solar and renewable energy loans under such paragraph. Any determination by the President of the Bank under this paragraph shall be promptly transmitted in writing to Congress."

(e) **OVERSEAS PRIVATE INVESTMENT CORPORATION LOANS.**—Section 234(e) of the Foreign Assistance Act of 1961 is amended—

(1) in the first sentence, by inserting after "cooperatives" the following: "and including the initiation of incentives, grants, and studies for renewable energy and other small business activities"; and

(2) by adding at the end thereof the following new sentence: "Administrative funds may not be made available for incentives, grants, and studies for renewable energy and other small business activities."

(f) **SMALL BUSINESS LOANS.**—(1) Section 7(1) of the Small Business Act (15 U.S.C. 636(1)) is repealed.

(2) Section 7(a)(12) of such Act (15 U.S.C. 636(a)(12)) is amended to read as follows:

"(12)(A) The Administrator may provide loans under this subsection to assist any small business concern, including startup, to enable such concern to design architecturally or engineer, manufacture, distribute, market, install, or service energy measures. Proceeds of loans under this paragraph shall not be used for research and development.

"(B) Not less than .025 percentum of the loan authority provided in any fiscal year under this subsection shall be available only for loans under this paragraph. The Administrator shall include a list of solar and renewable energy loans in an annual report to Congress.

"(C) The Administrator may waive the requirements of subparagraph (B) if he determines, after June 30 of the fiscal year in question, that the Administrator is unlikely to receive during such fiscal year a sufficient number of qualified proposals to exhaust the loan authority made available for solar and renewable energy loans under such sentence. Any determination under this subparagraph shall be promptly transmitted in writing to Congress."

(3) Section 7(a)(14) of such Act (15 U.S.C. 636(a)(14)) is amended to read as follows:

"(14) The Administrator under this subsection may provide extensions and revolving lines of credit for export purposes to enable small business concerns to develop foreign markets and for preexport financing. No such extension or revolving line of credit may be made for a period or periods exceeding eighteen months. A bank or participating lending institution may establish the rate of interest in extensions and revolving lines of credit as may be legal and reasonable. The Administrator shall give due consideration to the export potential of solar and renewable energy products in implementing his authorities under this subsection and shall include a list of solar and renewable energy loan guarantees in an annual report to the Congress."

SEC. 209. REPORTS.

(a) **REPORT BY THE SECRETARY.**—One year after the date of the enactment of this title and annually thereafter, the Secretary shall report to Congress on the programs, projects, and joint research and development ventures conducted under this title and the progress being made towards accomplishing the goals and purposes set forth in this title, including the national goals set forth in section 204(a).

(b) **NATIONAL ENERGY POLICY PLAN REPORT.**—Each annual submission of the National Energy Policy Plan under title VIII of Public Law 95-91 shall be accompanied by a three-year strategic plan for energy technology research, development, and demonstration. Such plan shall address the role of federally assisted research, development, and demonstration in the achievement of the national policy goals of the National Energy Policy Plan and shall assess both the level of support for energy research, development, and demonstration reasonably necessary to achieve these goals and the basis for allocating the support recommended by the President among the available alternatives. At a minimum, these alternatives shall include energy efficiency and renewable energy technologies.

Amend the title so as to read as follows:

"A bill to better integrate universities and private industry into the National Laboratory System of the Department of Energy so as to speed the development of technology in areas of significant economic potential, to provide Federal assistance and leadership to a program of research, development, and demonstration of renewable energy and energy efficiency technologies, and for other purposes".

PURPOSE OF THE MEASURE

The purpose of H.R. 4505, as ordered reported, is to—

Provide national organization and coordination in the research, development and commercialization and high-temperature superconductors;

To ensure the full use of the results of investment in the research and development carried out by the national laboratories of the Department of Energy in meeting international competition;

Establish long-term goals and multiyear funding levels for research, development, and demonstration in renewable energy and energy efficiency technologies;

Direct the Secretary of Energy to undertake initiatives to hasten the commercialization of renewable energy and energy efficiency technologies; and

Foster collaborative joint venture research and development efforts involving the private sector.

BACKGROUND AND NEED

Title I of the bill consists of the text of S. 1480, the "Department of Energy National Laboratory Cooperative Research Initiatives Act", as reported to the Senate by the Committee on September 23, 1988 (Senate Report 100-544). Title I is divided into two subtitles. Subtitle A establishes a program of research in technology for high-temperature superconductivity at the Department of Energy national laboratories. Subtitle B addresses technology transfer at the Department of Energy national laboratories. These subtitles are discussed below. The discussion of subtitles A and B is followed by a discussion of title II, which consists of the text of S. 1554, the "Renewable Energy and Energy Efficiency Technology Competitiveness Act of 1988", as reported to the Senate by the Committee on September 22, 1988 (Senate Report 100-523). Title II establishes program goals and multi-year funding levels for renewable energy and energy efficiency research, development, and demonstration programs of the Department of Energy.

BACKGROUND—TITLE I, SUBTITLE A

Superconductivity is a property that certain materials have to exhibit zero resistance to the flow of electric current. Recently discovered high temperature superconductive materials (superconducting above the boiling temperature of liquid nitrogen) could lead to vast improvements in electrical energy generation, storage, and transmission; transportation; electronics; electronic computation; electric power production from fusion and magnetohydrodynamics; and medicine.

Exciting advances are being made in the discovery of materials that exhibit superconductive properties at high temperatures. This research, which is already the basis of substantial private investment in electronic and medical applications, has seen greater advances in the last two years than has been obtained in the past 75 years. The recent discoveries will permit cost reductions to be made in many of the existing superconducting technology applications.

The Department of Energy has been a major participant in high-temperature superconductor research. Several DOE laboratories have strong foundations in superconductivity, based upon years of

work on magnets for high-energy physics research and on electric power transmission.

NEED FOR SUBTITLE A

Much needs to be done to assure that U.S. industry can capitalize upon the research being undertaken at Department of Energy national laboratories and by other Federal agencies. The Federal government must improve coordination of its research efforts and in particular, the transfer of this new technology into products. A committed effort by other nations to develop and commercialize high-temperature superconductors, most notably Japan, is already well underway.

The Department of Energy national laboratories are well suited to lead a national effort in research and development in high-temperature superconductivity, but these laboratories lack experience in translating research and development into useful, commercial applications. This Committee heard testimony to this effect from John Alic of the Office of Technology Assessment, who was the key author of a June, 1988 OTA report on "Commercializing High Temperature Superconductivity." Alic noted:

DOE's laboratories do not, however, have much of a track record in helping industry commercialize new technologies. The task, as S. 1480 recognizes, is to utilize their resources more effectively. If cooperative arrangements and rapid technology transfers to industry are to flourish, the laboratories will have to change in style and culture.

Title I is intended to focus and coordinate the national effort in high-temperature superconductor research and development at the DOE national laboratories. Title I requires the Secretary of Energy to carry out a cooperative research initiative in high-temperature superconductivity, bringing the national laboratories together with universities and private domestic firms to develop the critical enabling technologies for high-temperature superconductivity.

BACKGROUND—TITLE I, SUBTITLE B

In 1987 the U.S. Government provided just over \$50 billion for research and development, and private sources provided just under \$50 billion. Approximately 35 percent of Government-sponsored research and development is carried out in Government laboratories.

The composition of the government's R&D effort has changed significantly since 1980. In 1980, 50 percent of Government R&D went to defense programs. In 1987 the estimated share of Government R&D for defense increased to 69 percent. This increase in defense R&D brought the R&D intensity of U.S. spending (the ratio of R&D expenditures to gross national product) back from a low of 2.1 percent in 1977 to near the 2.9 percent figure that had prevailed in the mid 1960's. The United States R&D intensity is now quite similar to that of Japan and West Germany, although the non-defense contribution to R&D in those countries is significantly above the share of non-defense research in the United States.

The Federal contribution to research and development is a major investment by the taxpayer. This investment has brought returns

in varying degrees that appear to depend critically on the management of the technology transfer function of the research and development process. The increase in the portion of Federal research and development taking place within the national defense complex has brought new importance to the management of technology transfer from laboratories that conduct defense research and development.

Over the years, Government-sponsored R&D has produced technology with important applications not necessarily related to the original mission of the research. Civilian applications of NASA space technology are perhaps the best known. However, the Department of Energy's civilian and defense R&D programs have also generated significant contributions to the domestic economy through the transfer of DOE-developed technology.

Prior to 1980 there was relatively little effort made to maximize the applications of Federally funded research and development at the Department of Energy national laboratories. Encouraging the transfer to private use of technology developed in these laboratories was regarded as an activity subordinate to, and perhaps also detrimental to, the missions assigned the laboratories by Congress. This attitude was particularly strong in the Department of Energy laboratories assigned to defense missions.

However, in recent years concern has grown about the U.S. trade deficit and the ability of U.S. businesses to compete in world markets. In response to these concerns, the Administration and the Congress have acted to strengthen the links between the nation's research and technology base at the Department of Energy national laboratories and the competitiveness of U.S. industry. It has become evident that better management of technology transfer at these laboratories has the potential to enhance this competitiveness.

In attempting to improve the process of technology transfer, Congress has acted to decentralize management responsibilities for technology to allow the important decisions to be made by people as close as possible to where the technology is being developed. The Stevenson-Wydler Technology Innovation Act of 1980 (P.L. 96-480) and the Patent and Trademark Amendments of 1980, the Bayh-Dole Act (P.L. 96-517), are examples of actions that enable Federal laboratories to more effectively transfer technology to U.S. businesses by allowing industry to engage in cooperative research and development agreements with the laboratories and to obtain licenses to inventions made at the laboratories.

However, despite the changes that have been made in the relationship between Federal laboratories and the private sector, the current situation is far from optimal for effective technology transfer at all government laboratories. Under current law one set of rules applies to Government-owned and operated laboratories; another set applies to some Government-owned, contractor-operated laboratories; and, a third set of rules applies to other Government-owned, contractor-operated laboratories.

The Stevenson-Wydler Act took a first step to improve the utilization of federally funded technology by directing each Government-operated laboratory to establish an office of research and

technology applications to disseminate information about products processes, and services developed at the laboratory.

Before 1980 the government had the option to retain title to rights to all inventions resulting from federally funded research and development, although these rights could be waived under certain conditions. The Patent and Trademark Amendments of 1980 (Bahy-Dole) encouraged the licensing of inventions made at Government-operated and contractor-operated laboratories by authorizing Federal agencies to grant exclusive and partially exclusive licenses if the agency determines that it is appropriate and in the public interest. In all cases, the Federal Government retained a royalty-free license to use for government purposes. The laboratories covered were those operated by non-profit corporations, universities or small businesses so long as the laboratory did not have a nuclear weapons or naval nuclear propulsion mission.

The Federal Technology Transfer Act of 1986 (P.L. 99-502) amended Stevenson-Wydler Act to authorize Federal agencies to permit their government-operated laboratories to collaborate on research and development with businesses through cooperative research and development agreements. The intent of the Act is to make entering into these agreements as easy as possible from the point of view of the private industry involved, while protecting the legitimate concerns of the government.

In April 1987, the President issued Executive Order 12591, "Facilitating Access to Science and Technology". The order implements the Federal Technology Transfer Act by directing the Government-operated Federal laboratories to enter into cooperative research and development agreements and to license, assign or waive rights to intellectual property. The concept of intellectual property includes inventions and computer software that a laboratory develops.

The cumulative result of these four actions is that the rules are different for each Department of Energy National Laboratory.

Department of Energy's research laboratories operated by universities, such as Argonne National Laboratory or Brookhaven National Laboratory, are authorized to elect to retain title to almost all inventions that they make.

Department of Energy's research laboratories operated by large businesses, including Oak Ridge National Laboratory and Idaho National Engineering Laboratory, are not covered by the statutes discussed above. Furthermore, it is unclear whether these laboratories are covered by the President's executive order.

Department of Energy's contractor-operated laboratories that are primarily dedicated to naval nuclear propulsion or weapons related research (including Sandia National Laboratories, Lawrence Livermore National Laboratory, and Los Alamos National Laboratory) are specifically precluded from taking title to inventions that they make without obtaining Department of Energy approval through a case-by-case application for a waiver. This process takes anywhere from three to 52 months and represents a significant uncertainty that inhibits technology transfer from these laboratories.

Nevertheless progress is being made to make Department of Energy national laboratories "user friendly" to U.S. industry. This legislation would advance that progress by extending the provisions of Bayh-Dole Act to all Department of Energy national laboratories (except for nuclear propulsion laboratories). The legislation undertakes to balance the need for national security with the need to facilitate commercialization opportunities from research being conducted at the national laboratories. The legislation also streamlines the process under which private industry can participate in cooperative research at the national laboratories.

NEED FOR SUBTITLE B

More scientific breakthroughs occur and more patents are issued in the United States than anywhere else in the world.

This success at technology transfer occurs to a very great extent outside one of our nation's most valuable, yet least well known, scientific resources—the Department of Energy's national laboratories. In recent years we have witnessed other countries, such as Japan, put to quick commercial use knowledge and technologies first developed at our national laboratories.

Department of Energy national laboratories appears to have two related problems in managing technology transfer. First, there is a difficulty in attracting industries and universities to take advantage of the scientific expertise of the national laboratories. Second, the red tape and delays private companies face when doing business with the national laboratories impose significant disincentives on use of this scientific expertise even if it is properly appreciated.

Both of these problems have roots in the history of the labs themselves. The Department of Energy defense laboratories in particular have tended to discourage technology transfer due to the national security implications of much of their work. These laboratories have a long history of secrecy and exclusion. For these laboratories, technology transfer is not thought of as a significant part of the laboratory mission. This attitude has kept the defense laboratories quite isolated from private industry.

The difficulties in improving relationships with private industry are compounded by the way technology is managed at the Department of Energy. The key to technology management is the assignment of rights to ownership of inventions and intellectual property. In most Federally-supported laboratories, such as the National Institute of Health and laboratories supported by the Department of Defense, ownership rights to inventions and intellectual property are assigned to the laboratory responsible for the innovation.

Such a system maximizes the technology transfer potential of an innovation and its potential for eventual economic success since the laboratory and the scientists most familiar with the capabilities, shortfalls, and possibilities of the innovation are directly responsible for negotiating the terms under which it is commercialized.

Such decentralized technology management is particularly important for innovations created by laboratories working cooperatively with private businesses. Often the commercial viability of a technological innovation is very sensitive to timing. Laboratories

need to negotiate contracts with private industry quickly if effective technology transfer is to be accomplished.

Much of the technology developed at the Department of Energy national laboratories is centrally controlled by DOE. While certain non-defense laboratories are permitted to elect title to some innovations, inventions and intellectual property created at defense-oriented laboratories are automatically retained by DOE.

There is much room for improvement within the DOE laboratory system. The DOE's Energy Research Advisory Board [ERAB] has issued several studies on what is needed to enhance the laboratory-industry relationship. Among the key recommendations made in ERAB reports in 1982, 1985, and, most recently, in 1988, are the following:

DOE should allow the laboratories to do more reimbursable work with industry; give the laboratories more flexibility to enter into cooperative agreements; decentralize DOE rules on commercial protection; and encourage personnel exchanges with industrial firms.

There is need for clarifications as to the importance of technology transfer as an inherent and high priority component of all the DOE programs.

Handling of proprietary matters needs to be simplified so as not to intimidate or frustrate laboratory or industrial researchers and thus impede collaborations and transfers between government and industry.

The laboratories need to be able to arrange for contracts and other forms of agreements with industry without cumbersome DOE authorization processes.

Cooperative research programs focused on an industrial sector are an effective method of improving relations with U.S. industry in order to address the interface barrier, and industry guidance should be used early in the planning stages of these activities.

Laboratory scientists rarely visit industrial laboratories; an opportunity for people-to-people transfer is essential.

While technology transfer can and should be increased to fulfill the potential of the laboratories, the scientific and defense contributions and the quality of the laboratories must be maintained.

Laboratories should create joint research programs with industry.

Intellectual property procedures must be continuously improved and greater delegation of authority provided to laboratory management.

A March 1988 GAO report cited the major constraints to technology transfer by the federal laboratories. These included:

Public dissemination of computer software, creating disincentives for marketing such products;

Lack of proprietary research capability, making business less inclined to enter into collaborative research and development agreements;

Uncertainty and delay in gaining title to inventions at DOE laboratories due to the waiver request process; and unnecessarily complex approval procedures.

This legislation undertakes to correct each of these identified deficiencies.

BACKGROUND—TITLE II

During the 1970's, under the stimulus of oil price shocks in 1973-74 and in 1979, the United States established a substantial program of research, development, and demonstration [RD&D] aimed at developing new sources of energy and new ways to use energy more efficiently. There was a broad consensus for this effort and considerable enthusiasm about its promise. In response to inflated oil prices throughout the 1970's, Congress made appropriations available in increasing amounts for energy RD&D in nuclear energy, fusion, solar and renewable energy, fossil energy, and energy conservation and for research into other, more exotic, energy forms.

By fiscal year 1980, Department of Energy appropriations were \$11.2 billion. Approximately 68 percent of the Department's 1980 appropriations were devoted to energy programs. Of this, approximately \$3.8 billion was spent on civilian energy RD&D. The appropriations for fossil energy research and development, excluding the synthetic fuels program, were about \$900 million in fiscal year 1980. The solar and renewable energy RD&D program received \$770 million. Energy conservation RD&D received \$300 million.

By comparison, the current Department of Energy RD&D Program, as it is portrayed by the appropriations for fiscal year 1988, is a substantially different one. The total appropriations available to the Department were \$14.1 billion in fiscal year 1988, but comparable energy RD&D programs only received about \$108 billion. Energy conservation research and development received \$156 million, and renewable energy research and development received \$149 million.

Two major factors contributed to this dramatic retrenchment in Federal support for energy RD&D.

First, since 1981, the administration consistently has advocated the restriction of Federal energy RD&D support to long-term, high-risk research on energy technologies. In this view Federal support for development and commercial demonstration of energy technologies is the sole responsibility of the private sector, based on market forces. This policy was adopted by the administration during a period of inflated energy prices, a situation that does not exist today. The only exception to it during the 1980's has been the administration's support for cost-shared joint ventures as a means of fostering the commercial demonstration of clean coal technologies.

The second major factor contributing to this retrenchment is the need to balance the Federal budget, which has led to across-the-board reductions in discretionary Federal spending. In spite of these budgetary pressures, Congress has consistently appropriated more than the administration has requested for federal energy RD&D programs. However, in no sense has congressional support for these programs approximated the commitment to them that prevailed in the 1970's, nor can such a commitment be expected as long as these budgetary pressures continue.

These two factors have combined to create an environment of uncertainty in which neither the Federal Government nor private industry has sufficient incentive to undertake the commercial development of new energy technologies. This uncertainty has been most damaging to the commercialization of renewable energy and energy efficiency technologies. The majority of the firms that perform the RD&D for these technologies are small businesses whose access to capital and ability to withstand soft markets are limited in the best of circumstances. As long as energy prices remain at present levels substantial obstacles to the commercialization of these technologies will exist. Indeed, many of the firms that were active in renewable energy and energy efficiency RD&D have been forced to abandon their efforts.

This retrenchment has come at a time when international competition in renewable energy and energy efficiency technologies has been intensifying. It has come at a time when many renewable energy and energy efficiency technologies are nearing commercial viability. New markets for these technologies now appear to be opening up.

For example, the market share of United States firms in photovoltaics and wind energy machines, once strong, has declined significantly in the face of determined efforts by National Governments in Japan and in Europe to support their own emerging energy efficiency and renewable energy industries. U.S. manufacturers dominated the photovoltaics market through 1983, but by 1984 competitors were challenging this dominance. Boosted by sales of photovoltaics for calculators, Japan became world leader in photovoltaics sales in 1985. Companies in Europe and India have also increased market share relative to United States firms.

The photovoltaic market for calculators will soon give way to a much larger market for photovoltaics to supply electric power in rural and remote environments. Substantial growth in sales of photovoltaics throughout the 1990's for this application is widely anticipated. Foreign governments are mobilizing their own firms in preparation to challenge strongly for this growing market. In the United States, support for photovoltaics remains a fraction of the level that could produce a strong U.S. challenge.

U.S.-manufactured wind machines dominated domestic installations through 1985. Foreign imports were limited to a small percentage of the annual installation rate until 1984, when Danish companies began to make inroads. In 1986, foreign imports exceeded the installation of domestic machines for the first time, by a 2-to-1 ratio.

Thus, the United States has both withdrawn substantial support and raised the uncertainty about future support for its renewable energy and energy efficiency industries at a time that could be critical for the development of these technologies and the position of the U.S. industry in expanding world markets in such technologies.

NEED FOR TITLE II

Testimony before Congressional committees on the problems of making renewable sources of energy available to the U.S. economy has over and over again stressed the need for stable and predict-

able funding for the research efforts and the need to continue support for renewable technologies right up to the threshold of commercialization. Identical advice has been offered on the subject of new energy efficiency technologies.

In each case the private sector that will play the principal role in bringing forth marketable products will be overwhelmingly composed of small- to intermediate-sized firms. These firms will require assistance to be successful in their efforts, particularly in view of the strong interest on the part of foreign governments in supporting their own renewable energy and energy efficiency manufacturing and marketing firms.

The testimony received by Congress on the needs of U.S. firms working to commercialize renewable energy and energy efficiency technologies stands in contrast to the Administration's policy of emphasizing primarily long-range, high-risk research and avoiding any Federal role in the commercialization process. Over the past 7 years, Congress has attempted to provide additional resources for renewable energy and energy efficiency RD&D. These efforts have preserved some valuable research for future application, but have not resulted in anything like an optimal national program of research, development and demonstration, especially given the opportunities that world markets appear to offer and the competition that is developing for these markets.

The purpose of this legislation is to obtain some agreement between Congress and the administration about the goals of existing RD&D programs in renewable energy and energy efficiency and to provide stable multiyear funding targets to achieve those goals. The principal mechanism to achieve these goals is authorization of joint venture research and development efforts, incorporating significant cost sharing with private firms, similar to those now being used for the commercial demonstration of clean coal technologies.

In addition, the legislation seeks to provide Federal support for renewable energy and energy efficiency efforts to commercialize the technologies that have been developed from research carried out in the past. While current policies are resulting in good research, there is a lack of follow through leading to marketable products. The legislation attempts to address this concern by requiring greater emphasis on demonstrating commercially viable RD&D results in connection with cost sharing arrangements with private firms.

In renewable energy and energy efficiency research and development, there is a need to provide assistance in the transition from the stage of prototype testing to commercial demonstration. Long-range, high-risk research may be successfully assigned to government laboratories and universities, because the market-driven imperatives of commercialization will not become important to the design of the research until the risks have been reduced. However, once these risks have been reduced, it is critical to involve the private sector in the transition to commercialization. To carry out this transition efficiently, it is necessary to work in close consultation with private firms, especially including future customers for the technology. A vehicle for such cooperation that has proven useful in the past is the cost-shared demonstration under which a substantial share of the design and cost of the program is borne by pri-

vate firms and the detailed management of any project is entirely the responsibility of private participants.

In the case of energy efficiency and renewable energy RD&D, these cost-shared ventures can be particularly useful if the Federal Government can play a strong role in bringing together the manufacturing firms and users in support of projects that can define costs and increase user confidence in the state of the technology. The legislation encourages a partnership between government and the private sector in designing a commercialization strategy for promising renewable energy and energy efficiency technologies. Joint research and development ventures are proposed in the legislation in six areas in order to ensure that specific proposals will be forthcoming from the Administration. The six areas are general enough to permit the Department the flexibility to match the design of the joint venture to the commercialization needs of the technology in question. But six proposals are in fact required so that definitive action to further a partnership role for the Federal Government in commercialization will be ensured.

Without the partnership between the Federal Government, domestic manufacturers and marketers of renewable energy and energy efficiency technologies, and potential users that is envisaged by this legislation, the availability of these technologies U.S. economy could be substantially delayed. Moreover, without the partnership envisaged by this legislation, we could well find these technologies available only through sales personnel representing Japanese or European firms.

LEGISLATIVE HISTORY

Representative Marilyn Lloyd introduced H.R. 4505 on May 5, 1988. The bill was referred to the House Committee on Science, Space, and Technology. That Committee reported favorably on the bill with an amendment on May 19, 1988 (House Report 100-636). The bill passed the House on June 3, 1988 by a vote of 290-27.

H.R. 4505 was received in the Senate on June 7, 1988 and referred to the Committee on Energy and Natural Resources. At its business meeting on September 15, 1988, the Committee on Energy and Natural resources considered H.R. 4505, adopted an amendment in the nature of a substitute, and ordered the bill as amended favorably reported to the Senate.

COMMITTEE RECOMMENDATION AND TABULATION OF VOTES

The Committee on Energy and Natural Resources, in open business session on September 15, 1988 by unanimous vote of a quorum present, recommends that the Senate pass H.R. 4505, if amended as described herein.

COMMITTEE AMENDMENT

During consideration of H.R. 4505, the Committee struck the complete text of the House-passed bill and adopted an amendment in the nature of a substitute consisting of the text of S. 1554, as reported to the Senate by the Committee on September 22, 1988 (Senate Report 100-523), and the text of S. 1480, as reported by the

Committee to the Senate on September 23, 1988 (Senate Report 100-544). The Committee then ordered the substitute, as amended, favorably reported to the Senate. The principal changes in H.R. 4505 are described below. Additional details on the provisions of the bill as ordered reported are contained in the Section-By-Section Analysis portion of this report.

AMENDMENT IN THE NATURE OF A SUBSTITUTE

The House-passed bill, H.R. 4505, provides authorizations of appropriations for civilian research, development, and demonstration programs of the Department of Energy for fiscal year 1989. Also included in the bill are provisions—

- Authorizing the appropriation of specific amounts for the construction of the proposed Superconducting Super Collider project and governing the management of the project;

- Limiting the use of appropriated funds by the Secretary to programs authorized by Congress;

- Requiring certain reports by the Secretary of Energy;

- Renaming the Los Alamos Neutron Scattering Center as the "Manuel Lujan, Jr. Neutron Scattering Center";

- Limiting the use of funds to workplaces that are free of illegal use of controlled substances; and

- Establishing a preference for domestic firms in contracting by the Secretary.

The Committee deleted the House-passed language in its entirety and substituted in its place the texts of the Committee-reported versions of S. 1480 and S. 1554.

The Committee-reported version of S. 1480 consists of two titles: A title coordinating research by the Department of Energy in high-temperature superconductivity and a title addressing the commercialization of technology developed at the Department's national laboratories.

S. 1554, as reported by the Committee, provides program goals and multi-year (1990, 1991, and 1992) authorizations for renewable energy and energy efficient programs of the Department of Energy and also incorporates major provisions of S. 1320, the "Solar Development Initiative Act of 1987". The provisions of S. 1320 adopted amend a number of existing renewable energy programs with the aim of making these programs more flexible.

Additional details on the provisions of H.R. 4505, as ordered reported, are contained in the Section-by-Section Analysis portion of this report.

SECTION-BY-SECTION ANALYSIS

TITLE I—NATIONAL LABORATORY COOPERATIVE RESEARCH INITIATIVES

Section 101 provides the short title of the title I, the "Department of Energy National Laboratory Cooperative Research Initiatives Act".

Section 102 contains the definitions of the terms used in title I as a whole, including a listing of the national laboratories of the Department of Energy that are subject to the bill. Section 102 specifically provides that the Naval Nuclear Propulsion Laboratories, and

their contractors or subcontractors performing work covered by Executive Order 12344, are not subject to the title.

Section 103 provides that it is a mission of the Department of Energy national laboratories to foster, consistent with the national security and a fair return on the taxpayers' investment in these laboratories, the commercialization of technology developed in connection with other missions of the laboratories. This section also directs the Secretary of Energy to take those actions that he finds appropriate and consistent with law to further the mission of the commercialization of such technology.

Subtitle A—The Department of Energy National Laboratories Centers for Research on Enabling Technologies for High-Temperature Superconducting Applications

Section 110 contains the findings for subtitle A.

Section 112 contains the purposes of subtitle A.

Section 113 requires the Secretary of Energy to carry out a "Superconductor Research Initiative" on enabling technology for high-temperature superconductivity and on practical applications of high-temperature superconductor technology.

Section 114 provides for participation in the Initiative by the national laboratories of the Department of Energy.

Subsection (a) requires the Secretary of Energy to ensure participation of the national laboratories in the Initiative to the extent that such participation does not detract from the primary mission of any participating laboratory.

Subsection (b) directs the Secretary to enter into such agreements as may be necessary to provide for participation of the national laboratories in the Initiative.

Subsection (c) requires that the Initiative include provisions for one or more national laboratories to conduct research and development activities on high-temperature superconductivity.

Section 115 sets forth the principal elements of the Initiative.

Subsection (a) requires the Secretary to form a "Council on Research on Enabling Technologies" to act as an advisory body to the Secretary in setting goals and strategies for the Initiative. The Council would also recommend guidelines for the release of technical findings and developments under the Initiative. The recommendations of the Council would be public. These guidelines must be consistent with any guidelines for release of such information set forth by federal agencies affected by the guidelines.

Subsection (b) requires the Secretary to establish cooperative research centers in enabling technology for high-temperature superconducting materials and applications at one or more national laboratories with appropriate university and private industry participants. These centers would be located at national laboratories that demonstrate expertise in high-temperature superconductivity research and research in associated technologies.

Subsection (c) requires the Council to recommend measures to ensure that unnecessarily duplicative research or activities are not being carried out at the cooperative research centers.

Section 116 authorizes the Initiative to include provisions for the temporary exchange of personnel between domestic firms or uni-

versities participating in the Initiative and a participating national laboratory, subject to any restrictions, limitations, terms, and conditions as the Secretary considers necessary in the interests of national security.

Section 117 requires the Secretary to make available to participants in the Initiative any facilities, personnel, equipment, services, and other resources of the Department for the purpose of conducting research and development projects under the Initiative. The Secretary may make facilities available under the Initiative only to the extent that the cost of the use of such facilities is reimbursed by the user.

Section 118 authorizes the Secretary in preparing the research and development budget of the Department of Energy to include support for programs, projects, and activities that encourage the development of technology in high-temperature superconductivity.

Section 119 describes cost-sharing agreements under the Initiative.

Subsection (a) requires the Secretary to provide to the director of each national laboratory participating in the Initiative the authority to include a cost-sharing provision in any cooperative research and development agreement under the Initiative.

Subsection (b) provides that the director of any national laboratory participating in the Initiative may undertake work for others under the Initiative only when facilities of the laboratory are available and when such work would not interfere with other Department of Energy programs. Work for others under the Initiative must be conducted by the director so as to not create a future detrimental burden on the laboratory.

Subsection (c) provides that unless the Secretary approves in advance, no participating laboratory may receive more than 10% of that laboratory's annual budget in any year from non-appropriated funds derived from work for others under the Initiative. In addition, no such laboratory may receive in any year more than \$10 million in non-appropriated funds under any cooperative research and development agreement under the Initiative except as provided by authority delegated by the Secretary and except to the extent approved in advance by the Secretary. The provision requires the Secretary to delegate to the director of each national laboratory authority to receive in any year up to \$10 million in non-appropriated funds under the Initiative.

Section 120 provides for oversight of agreements under the Initiative.

Subsection (a) authorizes the Secretary to review and modify or disapprove any cooperative research and development agreement under the Initiative. The Secretary may exercise this authority during a 30-day period after the submission of the agreement to the Secretary. The Secretary must explain in writing any disapproval or modification under this section.

Subsection (b) requires each national laboratory participating in the Initiative to maintain a record of all cooperative research and development agreements under the Initiative and to submit such record to the Secretary on an annual basis.

Section 121 requires the Secretary to ensure that unnecessarily duplicative research is not performed at research facilities of entities participating in the Initiative.

Section 122 specifies the treatment of agreements, associations, or consortia under the Initiative under the Internal Revenue Code.

Subsection (a) provides that any such cooperative agreement, association or consortium established by the Department of Energy under the Initiative will be treated as a nonprofit organization under section 501(c)(3) of the Internal Revenue Code and shall be exempt from tax under section 501(a) of such Code with respect to activities under the Initiative.

Subsection (b) provides that any amounts transferred under the Initiative to participants in any cooperative agreement, any association, or consortium under the Initiative shall be treated as basic research payments for purposes of section 41(a)(2) of the Internal Revenue Code.

Subsection (c) provides that no gain or loss for tax purposes will be recognized in connection with the transfer under the Initiative of any patent, copyright, trademark, trade secret, mask work, or other intellectual property by or between participants in a cooperative agreement, an association, or consortium under the Initiative or any participating member of such association or consortium. The basis for tax purposes of any property transferred would not change.

Section 123 provides the same limited antitrust defenses available to a joint research and development venture under the National Cooperative Research Act of 1984 for participants in a cooperative agreement or for an association or consortium established by the Secretary of Energy or the national laboratories under the Initiative.

Subtitle B—Technology Management at the Department of Energy National Laboratories

Section 131 contains the findings and purpose for subtitle B.

Section 132 Requires the Secretary of Energy to carry out two reviews and to implement policies based on one of these reviews.

Subsection (a) requires the Secretary to review regulations, policies, procedures, and administrative processes affecting the ability of DOE national laboratory directors to carry out cooperative research with private industry or with universities.

Subsection (b) requires the Secretary to review the impact of the exchange of scientific information, scientific innovation, and commercialization resulting from cooperative research and development agreements and to conduct a survey on non-federal parties to determine if adequate measures exist to encourage scientific innovation and commercialization resulting from these agreements. Policy recommendations that are based on this study would be submitted to Congress.

Subsection (c) directs the Secretary to develop guidelines based on the review under subsection (a). Subsection (c) also requires the Secretary to report to Congress and the President within 90 days after the enactment of the Act on the review under subsection (a) and requires the Secretary to implement the guidelines relating to

the review under subsection (a) within 180 days after such enactment.

This section limits the requirements to implement guidelines to those matters described in subsection (a). The section does not apply to the exchange of scientific information or access to such information, which are topics that may be addressed in the study under subsection (b). With regard to the study under subsection (b), existing law continues to govern the authority and the responsibilities of the Secretary with respect to access to information. This section of the Act merely authorizes the Secretary to make recommendations to Congress on the issue of access to information.

Section 133 establishes as Congressional policy that intellectual property rights in technology developed at Department of Energy national laboratories be managed so as to promote the competitiveness of United States industries and directs the Secretary of Energy to promulgate policy guidelines for management of cooperative research and development agreements and intellectual property rights arising under such agreements. Under this policy, directors of the national laboratories would devise implementing procedures consistent with the Secretary's guidelines.

Section 134 contains definitions of the terms used in subtitle B. The Committee did not include a definition of "commercially valuable technical data" so as to avoid any suggestion that, by enactment of this subtitle, the Secretary would acquire new authority or be subject to new requirements with respect to the release of technical data. Subtitle B does not change existing law in this regard. Because the concept of a "trade secret" can also encompass technical data, this term was removed from the definition of "intellectual property".

Section 135 describes the relationship between the Secretary of Energy and the directors of the national laboratories in carrying out cooperative research with the private sector, the universities and others and in commercializing the resulting technology.

Subsection (a) requires the Secretary to prescribe regulations to ensure that contracts for operation of a national laboratory authorizes the director to enter into cooperative research and development agreements and to negotiate intellectual property licensing agreements for inventions, technical data, or computer software owned, assigned, or licensed to the laboratory.

Subsection (b) authorizes a director of a national laboratory to include provisions in any cooperative research and development agreement permitting the laboratory manager or operator to accept funds, personnel, services, and property from collaborating parties, to grant or agree to grant in advance to a collaborating party intellectual property rights, and, to the extent consistent with Department of Energy conflict-of-interest policies, allow an employee of a laboratory manager or operator to participate in efforts to transfer intellectual property rights developed by the employee while in the service of the manager or operator. The liabilities of the parties to any cooperative research and development agreement would be specified in the agreement by the affected parties.

Subsection (c) requires the director of a national laboratory before entering into a cooperative research and development agree-

ment to determine that facilities of the laboratory are available for work under the agreement, that the work would not interfere with Department of Energy programs and would not create a future detrimental burden on the laboratory, and that the proposed agreement is consistent with the applicable guidelines of the Secretary for such agreements.

Subsection (d) authorizes the Secretary of Energy to disapprove or require modification of any agreement under subsection (a) within a 30-day period beginning on the date the agreement is presented to the Secretary by the director of the laboratory concerned. If no action is taken in the 30-day period, the agreement is deemed approved. The Secretary must explain in writing his reasons for any disapproval or required modification.

Subsection (e) limits the cumulative total of nonappropriated funds received in any fiscal year under all agreements entered into by any director of a national laboratory under this title to 10 percent of the annual budget of the laboratory for such year. Included in this limit are any non-appropriated funds received in connection with the high-temperature superconductivity initiative established under subtitle A.

Subsection (f) requires each national laboratory to maintain a record of all agreements entered into under this subtitle and to submit the record to the Secretary annually.

Section 136 contains further provisions governing cooperative agreements involving the national laboratories.

The section contains criteria to be used by a laboratory director in deciding to enter into cooperative agreements. The director must give special consideration to small business firms and consortia involving small business firms and preference to businesses located in the United States that agree that products resulting from the collaboration will be developed and manufactured substantially in the United States. The director must also, in the case of persons subject to foreign control, take into consideration whether the foreign government in question permits persons from the United States to enter into cooperative research and development and licensing agreements. Finally, the director must provide opportunity for university participation in cooperative agreements when such participation will contribute to the purpose of this subtitle.

Section 137 contains provisions governing patents on inventions developed at national laboratories.

Subsection (a) requires the Secretary of Energy to dispose of the title to any invention made under a contract with a national laboratory in the same manner as if the applicant were a small business or a nonprofit organization under Chapter 18 of title 35, United States Code.

Subsection (b) provides that whenever the Secretary determines to retain title to an invention made at a national laboratory under an agreement under this title because of exceptional circumstances under section 202(a)(ii) of title 35, United States Code or because the invention is made under a funding agreement described in section 202(a)(iv) of title 35, title to the invention shall be retained by the Government unless the national laboratory in question requests the title. If the national laboratory requests the title and the Secretary does not notify the director of the laboratory within 90

days after receipt of the request that the invention is covered by sections 202(a) (i) or (iv) or has been designated sensitive technical information, the title would remain with the laboratory.

Inventions that arise outside the scope of an agreement under this title would remain with the Government unless the laboratory made an application for, and received, a waiver under existing law.

Subsection (b) prohibits the Secretary from retaining title to such an invention under the exception of section 202(a)(iv) of title 35, United States Code, without first determining that the invention has been classified or designated sensitive technical information.

This subsection also provides that the Secretary may not use export control statutes as the sole basis for refusing to request title to an invention first conceived and reduced to practice under a contract with a national laboratory.

Section 138 authorizes the waiver or omission of any of the rights of the federal government or the obligations of a national laboratory described in chapter 18 of title 35, United States Code, if the Secretary determines that the interests of the United States and the general public will be better promoted by the waiver or omission. The waiver or omission would be considered by the Secretary in three circumstances: if necessary to obtain a unique or highly qualified contractor; if the subject invention results from cost shared research, and the contractor involved is making a substantial contribution to the work; or if the invention will require substantial additional investment in development before a product is created, and the primary market for the product is expected to be the United States.

Section 139 contains provisions governing contracts between the Department of Energy and national laboratories.

Subsection (a) requires any funding agreement with a national laboratory to contain provisions as follows:

To restrict the use of any royalties or income earned by the manager or operator of a national laboratory to uses authorized under existing law;

To provide that the costs of obtaining and protecting intellectual property rights owned by the laboratory be paid for by the laboratory;

To provide that the national laboratory take responsibility for management of intellectual property rights created at such laboratory; and

To prohibit the manager or operator of a national laboratory from receiving money or other benefit from the use or licensing of such property for the benefit of such manager or operator.

This last prohibition would not apply to research and development associated with activities of the laboratory, to the promotion of technology transfer as authorized by law, or in special circumstances approved by the Department of Energy manager of the Operations Office supervising the laboratory.

Subsection (b) requires the manager or operator of a national laboratory to pay compensation to the United States based on the value of intellectual property rights retained by the laboratory. The amount of payment would be set by arbitration as set forth in the subsection. Compensation would not be required if the contrac-

tor operating the laboratory receives no profit or fee beyond expenses and is offering the intellectual property for fair market value with any value or royalties received to be returned to the laboratory or to the United States.

Section 140 authorizes the Secretary to require licensing in accordance with existing law to third parties of all intellectual property subject to this title and owned by the manager or operator of a national laboratory.

Section 141 provides for oversight of the activities of national laboratories under this subtitle.

Section 142 provides for regulations for implementation of sections 135, 137, and 139 of the title. The Committee does not intend that any delay prescribing regulations delay the effectiveness of provisions of this subtitle. The Department of Energy has the responsibility to manage its laboratories and to ensure effective conduct of their mission work when applying the directions set forth in this legislation. Therefore the Department has the sole authority and responsibility in drafting and implementing regulations under this subtitle.

Section 143 provides that the subtitle take effect of the date of its enactment. The Secretary of Energy must enter into negotiations with the contractor at each national laboratory subject to the subtitle to amend all existing contracts for operation of the laboratory to reflect the provisions of the title. Pending amendment of these contracts, the provisions of the subtitle govern the disposition of all intellectual property generated in performance of the contracts.

TITLE II—RENEWABLE ENERGY AND ENERGY EFFICIENCY

Section 201 provides the short title of title II: the "Renewable Energy and Energy Efficiency Technology Competitiveness Act of 1988".

Section 202 contains the findings and purposes of title II. An important purpose of the title is to shift the focus of efforts of the Department of Energy in research, development, and demonstration in energy efficiency and renewable energy technology towards realization in commercial terms of the fruits of the long-range, high risk research that the Department has emphasized in recent years. Accordingly, the title seeks to provide stability in future funding levels for these efforts, to direct the Secretary of Energy to place a significant new emphasis on commercialization of energy efficiency and renewable energy technologies, and to bring the private sector into a closer partnership with the Department in undertaking specific commercialization projects.

Section 203 contains the definitions of terms used in the title.

Section 204 provides long-term goals, multiyear authorizations of appropriations, and policy direction for the renewable energy research, development, and demonstration (RD&D) programs of the Department of Energy.

Subsection (a) set forth both general and technical goals for Department of Energy RD&D programs in wind, photovoltaics, and solar thermal technologies and requires the Secretary of Energy to submit goals for other RD&D programs in renewable energy in his fiscal year 1991 budget request. It is not the intent of this section

to reduce the flexibility of DOE program managers or to circumvent the processes of internal review within the Department that lead to the development of objectives for these programs. Rather, the intent is to obtain an agreement between the Administration and Congress about certain of the technical objectives of Federal renewable energy programs so that progress towards specific goals can be assessed on an annual basis and levels of proposed program effort in any year can be evaluated in relation to this progress. The Department is expected, at all times, to strive to meet these goals and to make full use of the authority in section 4(c)(3) to propose amended goals as a way of continuing the dialogue with Congress over the pace and direction of these programs.

Subsection (b) provides authorizations of appropriations for fiscal years 1990, 1991, and 1992 for Departmental RD&D programs in wind, photovoltaics, solar thermal systems, solar buildings, bio-fuels, ocean thermal energy systems, and geothermal energy.

Subsection (c) requires the Secretary to submit demonstration or proof-of-concept proposals involving renewable energy technologies in his 1992 budget request to present Congress by May 1, 1991 with options for furthering timely commercialization of renewable energy technologies that are near commercial application, and, when appropriate, to provide Congress with amended goals to replace those established under the Act. In requiring the development of proof-of-concept or demonstration proposals it is not intended that these proposals be funded at the expense of ongoing research. Rather, it is intended that definitive options be developed with appropriate internal review that can be submitted to Congress to be considered for additional funding consistent with other programmatic priorities. It is not anticipated that Congress will fund any demonstration project not found meritorious in furthering the commercialization of technologies for which research and development has reached a mature stage.

Section 205 provides multiyear authorizations of appropriations and policy direction for energy efficiency research, development, and demonstration programs of the Department of Energy.

Subsection (a) requires the Secretary of Energy to set aside in his budget requests for fiscal years 1991 and 1992 funds for new initiatives in energy efficiency research, development, and demonstration. The intent of the requirement to make a limited amount of funds available for new initiatives is to provide a mechanism to attract new ideas from the private sector or from within the DOE laboratories that have the potential to stimulate new areas of energy efficiency research, development or demonstration.

Subsection (b) provides authorization for appropriations for existing energy efficiency research, development, and demonstration programs of the Department for fiscal years 1990, 1991, and 1992.

Section 206 requires the Secretary of Energy to establish and provide financial assistance to six specified joint research and development ventures. These six topics are: photovoltaic energy systems; wind energy systems; solar thermal systems; factory-made housing; advanced district cooling technology; and renewable energy and energy efficiency technology export projects. Joint research and development ventures are defined in the National Cooperative Research Act of 1984. The Committee intends that the ventures under

this section qualify automatically as joint research and development ventures under that Act.

Section 7 requires the Secretary of Energy to review the activities of the Committee on Renewable Energy, Commerce, and Trade [CORECT] and provides for reports on the sufficiency of efforts to promote exports of renewable energy technology. CORECT would also be required to establish a joint government-industry plan to maintain or increase the market share of the trade of the United States in renewable energy technologies.

Section 8 contains several subsections amending current law to enhance the prospects for renewable energy and energy efficiency technologies in domestic commerce and in international trade.

Subsection (a) amends the provisions of the National Energy Conservation Policy Act to require that the Secretary of Energy establish a program to disseminate information for Federal procurement and loan officials on the lessons that can be learned from solar heating and solar heating and cooling technologies that have been employed in Federal buildings. This program is to include site visits and briefings for these officials.

Subsection (b) amends the Caribbean Basin Economic Recovery Act to include in the factors to be taken into account when the President designates beneficiary countries the promotion of energy self sufficiency using locally available renewable resources.

Subsection (c) modifies the defense procurement statutes to allow the Department of Defense more flexibility to decide which designs for new facilities have the greatest potential for solar energy and other renewable energy applications by making the potential for reduced energy costs the test for choosing such applications.

Subsection (d) provides a set-aside of 0.025 percent of the loans of the Export-Import Bank (approximately \$173,000 at the current Bank loan authority of \$690 million) for solar and renewable energy loans. The President of the Bank could waive this requirement for any fiscal year if he determines after June 30 of that year that there is unlikely to be a sufficient number of qualified proposals to exhaust the set-aside.

Subsection (e) amends the Foreign Assistance Act of 1961 to provide that funds be made available through the Overseas Private Investment Corporation to initiate incentives, grants, and studies for renewable energy and other small business activities.

Subsection (f) amends the Small Business Act to eliminate certain reporting requirements and to replace the existing separate energy loan program with a set-aside of 0.025 percent (approximately \$650,000 at the current Small Business Administration loan authority of \$2.6 billion) for solar and renewable energy loans in the general Small Business Administration loan program. The SBA Administrator may waive this set-aside requirement in any fiscal year if he determines after June 30 of that year that there is unlikely to be a sufficient number of qualified proposals to exhaust the set-aside.

Section 149 requires annual reports to Congress on activities under the title and progress being made towards accomplishing the goals of the title and requires the National Energy Policy Plan to assess research, development, and demonstration needs and to justify the allocation of support recommended.

COST AND BUDGETARY CONSIDERATIONS

The following estimate of the cost of this measure has been provided by the Congressional Budget Office:

U.S. CONGRESS,
CONGRESSIONAL BUDGET OFFICE,
Washington, DC, September 22, 1988.

Hon. J. BENNETT JOHNSTON, Jr.,
Chairman, Committee on Energy and Natural Resources, U.S. Senate, Washington, DC.

DEAR MR. CHAIRMAN: The Congressional Budget Office has prepared the attached cost estimate for H.R. 4505, the Department of Energy Research Initiatives and Technology Competitiveness Act of 1988.

If you wish further details on this estimate, we will be pleased to provide them.

Sincerely,

C.G. NUCKOLS
(For James L. Blum, Acting Director).

CONGRESSIONAL BUDGET OFFICE COST ESTIMATE

1. Bill number: H.R. 4505
2. Bill title: Department of Energy Research Initiatives and Technology Competitiveness Act of 1988
3. Bill status: As ordered reported by the Senate Committee on Energy and Natural Resources, September 15, 1988.
4. Bill purpose: The bill contains the text of two original bills that were previously approved by the Senate Committee on Energy and Natural Resources:

(1) the Renewable Energy and Energy Efficiency Technology Competitiveness Act of 1988 (S. 1554), and

(2) the Department of Energy National Laboratory Cooperative Research Act of 1988 (S. 1480).

The Renewable Energy and Energy Efficiency Technology Competitiveness Act of 1988 establishes national goals for federal wind, photovoltaics, and solar thermal programs, and authorizes funds for these and other renewable energy and energy conservation programs. The bill authorizes appropriations of \$379 million for fiscal year 1990, \$410 million for fiscal year 1991, and \$433 million for fiscal year 1992. The bill also directs the Export-Import bank and the Small Business Administration to use .025 percent of their existing federal loan authority for solar and renewable energy loans.

The Department of Energy (DOE) National Laboratory Cooperative Research Act of 1988:

- (1) establishes programs within DOE to promote research on high-temperature superconductors,
 - (2) requires DOE to develop regulations for cooperative research agreements between the national laboratories and private sector entities, and
 - (3) provides a tax exemption for any organization engaged in or any income derived from research under the cooperative agreements authorized by the bill.
5. Estimated cost to the Federal Government:

[By fiscal year, in millions of dollars]

	1989	1990	1991	1992	1993
Authorization level.....		379	410	433	
Estimated outlays.....		130	323	404	277

The costs of this bill fall within budget function 270.

CBO does not have sufficient information to estimate the impact on federal tax receipts for providing tax exemptions that engage in cooperative research as authorized by the bill.

Basis of Estimate: CBO assumes that all amounts authorized will be appropriated and that spending will occur at historical rates for similar research and development programs. The authorization levels are established in the bill for renewable energy and energy conservation programs.

CBO estimates that other provisions of the bill, regarding superconductivity research and cooperative research agreements, would have no significant effect on the federal budget.

6. Estimated cost to the State and local governments: None.

7. Estimate comparison: None.

8. Previous CBO estimate: On September 7, 1988, CBO prepared a cost estimate for S. 1554, the Renewable Energy and Energy Efficiency Technology Competitiveness Act of 1988, as ordered reported by the Senate Committee on Energy and Natural Resources, August 11, 1988. On September 9, 1988, CBO prepared a cost estimate for S. 1480, the Department of Energy National Laboratory Cooperative Research Act of 1988, as ordered reported by the Senate Committee on Energy and Natural Resources, August 11, 1988. The estimated costs for this bill, H.R. 4505, are identical to the previous estimates for S. 1554 and S. 1480.

On May, 1988, CBO prepared a cost estimate for H.R. 4505, the Department of Energy Civilian Research and Development Act for fiscal year 1989, as ordered reported by the House Committee on Science, Space and Technology, May 5, 1988. The differences between the House and Senate estimates reflect the different authorizations provided by the two committees.

9. Estimate prepared by: Peter Fontaine and Michael Sieverts.

10. Estimate approved by: C.G. Nuckols (for James L. Blum, Assistant Director for Budget Analysis).

REGULATORY IMPACT EVALUATION

In compliance with paragraph 11(b) of Rule XXVI of the Standing Rules of the Senate, the Committee makes the following evaluation of the regulatory impact that would be incurred in carrying out H.R. 4505.

The bill is not a regulatory measure in the sense of imposing government-established standards or significant economic responsibilities on private individuals or businesses. The bill directs the Secretary of Energy to carry out a research and development initiative in high-temperature superconductivity. In addition, under subtitle A of title I of the bill, the relationship between the Secretary of Energy and the contractors operating the Department of Energy

national laboratories would be modified in the interest of improving the transfer of technology developed at these laboratories. In title II, the bill contains authorizations for research, development and demonstration programs of the Secretary of energy and directives to the Secretary with respect to the operation of these programs. Any involvement of private firms and individuals in any of the research, development and demonstration programs covered by this act is voluntary.

No personal information would be collected in administering the Act. Therefore, there would be no impact on personal privacy from the bill.

Little, if any, additional paperwork would result from the enactment of H.R. 4505.

CHANGES IN EXISTING LAW

In compliance with paragraph 12 of Rule XXVI of the Standing Rules of the Senate, changes in existing law made by the bill S. 1554, as ordered reported, are shown as follows (existing law proposed to be omitted is enclosed in black brackets, new matter is printed in italic, and existing law in which no change is proposed is shown in roman):

NATIONAL ENERGY CONSERVATION POLICY ACT

Public Law 95-619, as Amended

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

TITLE I—GENERAL PROVISIONS

SEC. 101. SHORT TITLE AND TABLE OF CONTENTS.

(a) **SHORT TITLE.**—This Act may be cited as the “National Energy Conservation Policy Act”.

* * * * *

SEC. 522. FEDERAL SOLAR PROGRAM.

The Secretary, in consultation with the Administrator of the General Services Administration, shall develop and carry out a program to demonstrate the application to buildings of solar heating and solar heating and cooling technology in Federal buildings.

SEC. 523. DUTIES OF SECRETARY.

(a) **DUTIES.**—In exercising the authority provided by section 522, the Secretary, in consultation with the Administrator of the General Services Administration, shall—

(1) promulgate, by rule—

(A) requirements under which Federal agencies shall submit proposals for the installation of solar energy equipment in Federal buildings which are under their control and which are selected in accordance with procedures set forth in such rule, and

(B) criteria by which proposals under subparagraph (a) will be evaluated, which criteria shall provide for the inclusion in each proposal of a complete analysis of the present value, as determined by the Secretary, of the costs and benefits of the proposal to the Federal agency, and for the demonstration, to the maximum extent practicable, of innovative and diverse applications to a variety of types of Federal buildings of solar heating and solar heating and cooling technology, and for location of demonstration projects in areas where a private sector market for solar energy equipment is likely to develop;

(2) evaluate in writing each such proposal pursuant to the criteria promulgated pursuant to paragraph (1)(B), and make such evaluation available to the agency and, upon request, to any person;

(3) provide technical and financial assistance by interagency agreement for implementing a proposal evaluated under paragraph (2) and approved by the Secretary; except that such assistance shall be limited to the design, acquisition, construction, and installation of solar energy equipment;

(4) provide, by rule, that Federal agencies report to the Secretary periodically such information as they acquire respecting maintenance and operation of solar energy equipment for which assistance is provided under paragraph (3);

(5) require that a life cycle cost analysis in accordance with part 3 be done for any Federal building for which a proposal is submitted under this section and the results of such analysis be included in such proposal; and

(6) if solar energy equipment for which assistance is to be provided under paragraph (3) is not the minimum life-cycle cost alternative, require the Federal agency involved to submit a report to the Secretary stating the amount by which the life-cycle cost of such equipment exceeds the minimum life-cycle cost.

(b) **CONTENTS OF PROPOSALS.**—Proposals under paragraph (1)(A) of subsection (a) shall include a list of the specific Federal buildings proposed to be provided with solar energy equipment, the funds necessary for the acquisition and installation of such equipment, the proposed implementation schedule, maintenance costs, the estimated savings in fossil fuels and electricity, the estimated payback time, and such other information as may be required by the Secretary.

(c) **INITIAL SUBMISSION OF PROPOSALS.**—Under the requirements established under subsection (a)(1)(A), initial proposals for the installation of solar energy equipment in Federal buildings selected under subsection (a)(1)(A) shall be submitted not later than 180 days after the date of promulgation of the rule under subsection (a)(1).

(d) *In order to more widely disseminate information about the program under this part and under part 3 and the benefits of solar heating and solar heating and cooling technology, the Secretary shall establish a program to disseminate such information for Federal procurement officers and Federal loan officers that shall in-*

clude site visits and technical briefings. The Secretary shall utilize available funds for the program under this subsection.

* * * * *

Public Law 98-67

An ACT To promote economic revitalization and facilitate expansion of economic opportunities in the Caribbean Basin region, to provide for backup withholding of tax from interest and dividends, and for other purposes

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

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TITLE II—CARIBBEAN BASIN INITIATIVE

SEC. 201. SHORT TITLE.

This title may be cited as the "Caribbean Basin Economic Recovery Act".

* * * * *

SEC. 212. BENEFICIARY COUNTRY. * * *

* * * * *

(c) In determining whether to designate any country a beneficiary country under this title, the President shall take into account—

(1) an expression by such country of its desire to be so designated;

(2) the economic conditions in such country, the living standards of its inhabitants, and any other economic factors which he deems appropriate;

(3) the extent to which such country has assured the United States it will provide equitable and reasonable access to the markets and basic commodity resources of such country;

(4) the degree to which such country follows the accepted rules of international trade provided for under the General Agreement on Tariffs and Trade, as well as applicable trade agreements approved under section 2(a) of the Trade Agreements Act of 1979;

(5) the degree to which such country uses export subsidies or imposes export performance requirements or local content requirements which distort international trade;

(6) the degree to which the trade policies of such country as they relate to other beneficiary countries are contributing to the revitalization of the region;

[(7) the degree to which such country is undertaking self-help measures to promote its own economic development;]

(7) the degree to which such country is undertaking self-help measures to promote its own economic development and energy self-sufficiency using locally available renewable resources;

(8) the degree to which workers in such country are afforded reasonable workplace conditions and enjoy the right to organize and bargain collectively;

(9) the extent to which such country provides under its law adequate and effective means for foreign nationals to secure, exercise, and enforce exclusive rights in intellectual property, including patent, trademark, and copyright rights;

(10) the extent to which such country prohibits its nationals from engaging in the broadcast of copyrighted material, including films or television material, belonging to United States copyright owners without their express consent; and

(11) the extent to which such country is prepared to cooperate with the United States in the administration of the provisions of this title.

* * * * *

TITLE 10—ARMED FORCES

* * * * *

§ 2857. Use of renewable forms of energy in new facilities

(a) The Secretary of Defense shall encourage the use of energy systems using solar energy or other renewable forms of energy as a source of energy for military construction projects (including military family housing projects) where use of such form of energy would be practical and economically feasible.

(b)(1) The Secretary concerned shall require that the design of all new facilities (including family housing) shall include consideration of energy systems using solar energy or other renewable forms of energy in those cases in which use of such form of energy has the potential for **[significant savings of fossil-fuel-derived energy.]** *reduced energy costs.*

* * * * *

EXPORT-IMPORT BANK ACT OF 1945

* * * * *

SEC. 7 (a)(1) The Export-Import Bank of the United States shall not have outstanding at any one time loans, guaranties, and insurance in an aggregate amount in excess of \$40,000,000,000. All spending and credit authority provided under this subchapter shall be effective for any fiscal year only to such extent or in such amounts as are provided in appropriation Acts.

(2)(A)(i) Not later than March 31 of each fiscal year, the President of the United States shall determine whether the authority available to the Bank for such fiscal year will be sufficient to meet the Bank's needs, particularly those needs arising from—

(I) increases in the level of exports unforeseen at the time of the original budget request for such fiscal year;

(II) any increased foreign export credit subsidies; or

(III) the lack of progress in negotiations to reduce or eliminate export credit subsidies.

(ii) Not later than April 15 of each year, the President of the United States shall transmit to the Congress a report on such determination.

(B)(i) If the President of the United States finds that the amount of direct loan authority or guarantee authority available to the

Bank for the fiscal year involved exceeds the amount which will be necessary to carry out the Bank's functions consistent with the availability of qualified applications and limitations imposed by law during such year, the President of the United States shall promptly transmit to the Congress a request for legislation to eliminate the amount of such excess direct loan, loan guarantee, or insurance authority.

(ii) The Bank shall continue to make remaining amounts of its authority available for the fiscal year involved, in accordance with its practices and the requirements of this subchapter, unless otherwise directed pursuant to law.

(3) **AUTHORIZATION OF APPROPRIATION.**—There are authorized to be appropriated \$145,259,000 for fiscal year 1987 to cover the subsidy cost of new direct loans obligated by the Bank in that fiscal year. Any amounts appropriated under this paragraph shall be permanent additions to the capital and reserves of the Bank.

(b) After January 4, 1975, the Bank shall not approve any loans or financial guarantees, or combination thereof, in connection with exports to the Union of Soviet Socialist Republics in an aggregate amount in excess of \$300,000,000. No such loan or financial guarantee, or combination thereof, shall be for the purchase, lease, or procurement of any product or service for production (including processing and distribution) of fossil fuel energy resources. Not more than \$40,000,000 of such aggregate amount shall be for the purchase, lease, or procurement of any product or service which involves research or exploration of fossil fuel energy resources. The President may establish a limitation in excess of \$300,000,000 if the President determines that such higher limitation is in the national interest and if the President reports such determination to the Congress together with the reasons therefor, including the amount of such proposed increase which would be available for the export of products and services for research, exploration, and production (including processing and distribution) of fossil fuel energy resources in the Union of Soviet Socialist Republics, and if, after the receipt of such report together with the reasons, the Congress adopts a concurrent resolution approving such determination.

(c)(1) Not less than 0.025 percent of the loan authority of the Bank in any fiscal year shall be available only for solar and renewable energy loans.

(2) The President of the Bank may waive the requirements of paragraph (1) if he determines, after June 30 of the fiscal year in question, that the Bank is unlikely to receive during such fiscal year a sufficient number of qualified proposals to exhaust the loan authority made available for solar and renewable energy loans under such paragraph. Any determination by the President of the Bank under this paragraph shall be promptly transmitted in writing to Congress.

* * * * *

FOREIGN ASSISTANCE ACT OF 1961

AN ACT To promote the foreign policy, security, and general welfare of the United States by assisting peoples of the world in their efforts toward economic development and internal and external security, and for other purposes

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as "The Foreign Assistance Act of 1961."

SEC. 234. INVESTMENT INSURANCE AND OTHER PROGRAMS.—The Corporation is hereby authorized to do the following:

(e) SPECIAL ACTIVITIES.—To administer and manage special projects and programs, including programs of financial and advisory support which provide private technical, professional, or managerial assistance in the development of human resources, skills, technology, capital savings and intermediate financial and investment institutions and cooperatives *and including the initiation of incentives, grants, and studies for renewable energy and other small business activities.* The funds for these projects and programs may, with the Corporation's concurrence, be transferred to it for such purposes under the authority of section 632(a) or from other sources, public or private. *Administrative funds may not be made available for incentives, grants, and studies for renewable energy and other small business activities.*

SMALL BUSINESS ACT

ADDITIONAL POWERS

SEC. 7. (a) LOANS TO SMALL-BUSINESS CONCERNS; ALLOWABLE PURPOSES; QUALIFIED BUSINESS; RESTRICTIONS AND LIMITATIONS—The Administration is empowered to the extent and in such amounts as provided in advance in appropriation Acts to make loans for plant acquisition, construction, conversion, or expansion, including the acquisition of land, material, supplies, equipment, and working capital, and to make loans to any qualified small business concern, including those owned by qualified Indian tribes, for purposes of this chapter. Such financings may be made either directly or in cooperation with banks or other financial institutions through agreements to participate on an immediate or deferred (guaranteed) basis. These powers shall be subject, however, to the following restrictions, limitations, and provisions:

[(12) The Administration may provide loans under this subsection to assist any small business concern, including start up, to enable such concern to design architecturally or engineer, manufacture, distribute, market, install, or service energy measures: *Provided*, however, That such loan proceeds shall not be used primarily for research and development.]

(12)(A) *The Administrator may provide loans under this subsection to assist any small business concern, including startup, to enable such concern to design architecturally or engineer, manufacture, distribute, market, install, or service energy measures. Proceeds of loans under this paragraph shall not be used for research and development.*

(B) *Not less than .025 percent of the loan authority provided in any fiscal year under this subsection shall be available only for loans under this paragraph. The Administrator shall include a list of solar and renewable energy loans in an annual report to Congress.*

(C) *The Administrator may waive the requirements of subparagraph (B) if he determines, after June 30 of the fiscal year in question, that the Administrator is unlikely to receive during such fiscal year a sufficient number of qualified proposals to exhaust the loan authority made available for solar and renewable energy loans under such sentence. Any determination under this subparagraph shall be promptly transmitted in writing to Congress.*

* * * * *

[(14) *The Administration under this subsection may provide extensions and revolving lines of credit for export purposes to enable small business concerns to develop foreign markets and for preexport financing: Provided, however, That no such extension or revolving line of credit may be made for a period or periods exceeding eighteen months. A bank or participating lending institution may establish the rate of interest on extensions and revolving lines of credit as may be legal and reasonable.*]

(14) *The Administrator under this subsection may provide extensions and revolving lines of credit for export purposes to enable small business concerns to develop foreign markets and for preexport financing. No such extension or revolving line of credit may be made for a period or periods exceeding 18 months. A bank or participating lending institution may establish the rate of interest in extensions and revolving lines of credit as may be legal and reasonable. The Administrator shall give due consideration to the export potential of solar and renewable energy products in implementing his authorities under this subsection and shall include a list of solar and renewable energy loan guarantees in an annual report to the Congress.*

* * * * *

[(1) **LOANS TO SMALL BUSINESS CONCERNS FOR SOLAR ENERGY AND ENERGY CONSERVATION MEASURES.**—(1) The Administration also is empowered to make loans (either directly or in cooperation with banks or other lending institutions through agreements to participate on an immediate or deferred basis) as the Administrator may determine to be necessary or appropriate to assist any small business concern in financing plant construction, conversion, expansion (including acquisition of land for such a plant), or startup, and the acquisition of equipment, facilities, machinery, supplies, or materials to enable such concern to design architecturally or engineer, manufacture, distribute, market, install, or service any of the following energy measures:

[(A) Solar thermal energy equipment which is either of the active type based upon mechanically forced energy transfer or of the passive type based on convective, conductive, or radiant energy transfer or some combination of these types.

[(B) Photovoltaic cells and related equipment.

[(C) A product or service the primary purpose of which is conservation of energy through devices or techniques which increase the energy efficiency of existing equipment, methods of operation, or systems which use fossil fuels, and which is on the Energy Conservation Measures List of the Secretary of Energy or which the Administrator determines to be consistent with the intent of this subsection.

[(D) Equipment the primary purpose of which is production of energy from wood, biological waste, grain, or other biomass source of energy.

[(E) Equipment the primary purpose of which is industrial cogeneration of energy, district heating, or production of energy from industrial waste.

[(F) Hydroelectric power equipment.

[(G) Wind energy conversion equipment.

[(H) Engineering, architectural, consulting, or other professional services which are necessary or appropriate to aid citizens in using any of the measures described in subparagraphs (A) through (G).

[(Proceeds of loans under this subsection shall not be used primarily for research and development.

[(2) No loan shall be made under this subsection if the total amount outstanding and committed (by participation or otherwise) to the borrower from the business loan and investment fund established by this chapter would exceed \$500,000. No loan made or effected under this subsection directly or in cooperation with banks or other lending institutions through agreements to participate on an immediate basis shall exceed \$350,000.

[(3) No financial assistance shall be extended pursuant to this subsection unless the financial assistance applied for is not otherwise available on reasonable terms from non-Federal sources.

[(4) No immediate participation may be purchased unless it is shown that a deferred participation is not available; and no loan may be made unless it is shown that a participation is not available.

[(5) In agreements to participate in loans on a deferred basis under this subsection, the Administration's participation shall not be in excess of 90 per centum of the balance of the loan outstanding at the time of disbursement.

[(6) The Administration's share of any loan made under this subsection shall bear interest at the same rate as loans made under subsection (a) of this section. The maximum terms of any such loan, including extensions and renewals, may not exceed fifteen years.

[(7) All loans made under this subsection shall be of such sound value as reasonably to assure repayment, recognizing that greater risk may be associated with loans made to business concerns in this field: *Provided*, That factors in determining "sound value" shall in-

clude, but not be limited to, quality of the product or service; technical qualifications of the applicant or his employees; sale projections; and the financial status of the business concern: *Provided further*, That such status need not be as sound as that required for loans under subsection (a) of this section.

[(8)(A) The Administration, after consultation with the Department of Energy and other Federal departments and agencies as the Administrator deems appropriate, shall publish in the Federal Register for public comment not later than sixty days after July 4, 1978, proposed regulations to carry out the provisions of this subsection. The Administration shall make all reasonable efforts to solicit comments from small businesses and shall take into consideration comments submitted regarding such proposed regulations.]

[(B) The administration shall publish final regulations under this subsection not later than one hundred and eighty days after July 4, 1978.]

[(9) It is the intent of Congress that the paper-work burden and regulatory impact on applicants under this subsection shall be minimized, and that to the maximum extent practicable, the Administrator may rely upon consultation with the Department of Energy and other agencies, upon paid consultants, and upon voluntary public submissions of information to obtain market data, industry sales projections, energy savings, and other economic information needed to carry out the provisions of paragraph (1) (D) and (E). Nothing in this subsection shall be construed as precluding the Administrator from using any of his lawful powers to obtain information from applicants.]